

From: Phong Do
To: bill.eisma@power.alstom.com; kevin.spires@power.alstom.com
Date: 1/17/03 9:24AM
Subject: Balance Weights

Kevin,

Please confirm that the required field balance weights were shipped along with the Unit 1 rotor.

Last year, the Unit 2 HP rotor was shipped with the following balance weights:

- a. 3 each - 15 grams and 50 grams.
- b. 3 each - 16 grams and 60 grams.
- c. 3 each - 24 grams.
- d. 4 each - 80 grams
- e. 10 each small round weights

Thanks.

CC: Aaron Nissen; James Nelson

IP7008196

From: James Nelson
To: Aaron Nissen; Garry Christensen; Phong Do
Date: 8/8/02 10:57AM
Subject: Fwd: Intermountain 1 & 2 - HP Swallowing Capacity

This is only a slight variation of what Bob stated on the phone, not a meaningful change or reconciliation of our recorded MW output. Have not heard back yet from Adrian regarding the possibility of a forced meeting of the minds or greater reductions on Unit 1.

IP7008197

	5.1	5.6	5.2	6.3	5.2	5.3	5.2	5.5	5.2	5.2	5.3	5.2	5.2
5	12.2	13.4	12.2	15.0	12.2	12.6	12.2	13.0	12.2	12.4	12.2	12.6	12.2
2	42.2	46.3	42.3	52.1	42.3	43.6	42.2	45.0	42.2	42.9	42.2	43.6	42.2
3	70.7	77.5	70.7	87.5	70.7	73.5	70.6	75.5	70.7	71.5	70.7	72.5	70.7
0	135.1	146.3	135.0		135.0	139.5	135.0	143.9	135.0	137.2	135.0	139.4	135.0
8	137.2		137.2		137.2		137.2		137.2		137.2		137.2
1	257.6	282.5	256.8	O/S	O/S	265.9	257.2	274.3	256.9	261.7	257.5	265.8	257.3
7	615.2	663.2	602.2	O/S	O/S	635.7	614.4	656.2	614.0	625.3	615.0	O/S	O/S
5	1084.4	1134.6	1028.3	O/S	O/S	1124.2	1085.2	O/S	O/S	1065.1	1047.3	1012.4	980.6

Comparison of flow/ power output/ heat added with HP heaters isolated

	TS29247 VWO	One Heater String Isolated		Top 6 Heaters Isolated		One Top Heater isolated		Both top heaters isolated		One HP 7 heater isolated		Both HP 7 heaters isolated		One HP 6 h
		VWO	Throttling	VWO	Throttling	VWO	Throttling	VWO	Throttling	VWO	Throttling	VWO	Throttling	VWO
	6.9000	6.805	6.138	6.666	5.338	6.825	6.576	6.747	6.285	6.937	6.810	6.973	6.725	6.914
	973	1019	923	1084	870	991	956	1009	942	979	962	985	952	972
	7683	7521	7880	7994	8106	7720	7743	7754	7797	7716	7728	7746	7769	7696
	0.0 (datum)	6.5	-2.8	15.9	-5.6	2.3	-1.0	4.6	-1.7	1.0	-0.6	2.1	-1.1	0.1

Flow through each exhaust of LP turbine

um ible	TS29247 VWO	One Heater String Isolated		Top 6 Heaters Isolated		One Top Heater isolated		Both top heaters isolated		One HP 7 heater isolated		Both HP 7 heaters isolated		One HP 6 h
		VWO	Throttling	VWO	Throttling	VWO	Throttling	VWO	Throttling	VWO	Throttling	VWO	Throttling	VWO
	672360	733724	671174	820963	669988	693496	672153	714632	672287	682632	672296	692864	672151	673110
0	12093	13196	12071	14766	12050	12473	12089	12853	12091	12278	12092	12462	12089	12106

From: <bill.eisma@power.alstom.com>
To: <jim-n@ipsc.com>
Date: 5/10/02 8:43AM
Subject: 1350030. Delta 1 - Intermountain 1 Monthly progress report (Issued 10th May2002)

James,

Attached for your information and records is the updated progress report for Delta unit 1

(See attached file: Intermountain 1 HP retrofit progress - Issued 10th May '02.doc) (See attached file: W217Int 1 Proj.pdf)

Sincerely,

Bill Eisma

CONFIDENTIALITY:

This e-mail and any attachments are confidential and may be privileged. If you are not a named recipient, please notify the sender immediately and do not disclose the contents to another person, use it for any purpose, or store or copy the information in any medium.

CC: <phong-d@ipsc.com>

IP7008199

From: <bill.eisma@power.alstom.com>
To: <jim-n@ipsc.com>, <phong-d@ipsc.com>
Date: 5/2/02 11:45AM
Subject: A.0082E : Intermountain 1 HP Rotor forging (for interest)

Gentlemen,

Attached for your information is a picture of the rotor forging for unit 1.
The forging is now at our Rugby works available for machining.

Regards,

Bill Eisma

(See attached file: Intermountain 1 HP Rotor forging P4300002a.jpg)

CONFIDENTIALITY:

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IP7008200

From: <bill.eisma@power.alstom.com>
To: <phong-d@ipsc.com>
Date: 5/16/02 10:02AM
Subject: A.0085E - Intermountain 1 - HP Inner cylinder casing

Phong,

Please find attached for your information some photo's showing the progress on the inner casing

The casing (PO 302894) was programmed to arrive at Rugby site, from Zamec in Poland, week 0220.

(See attached file: P5150007.jpg) (See attached file: P5150008.jpg) (See attached file: P5150013.jpg) (See attached file: P5150011.jpg)

Best regards
Bill

CONFIDENTIALITY:

This e-mail and any attachments are confidential and may be privileged. If you are not a named recipient, please notify the sender immediately and do not disclose the contents to another person, use it for any purpose, or store or copy the information in any medium.

CC: <jim-n@ipsc.com>

IP7008201

Project: Intermountain Unit 1 & 2
Project Manager: Kevin Spires
Department: STRGP
Progress Report Number:
Issued Date: August 13th 2002
Customer Purchase Order No.: 01 - 45510
ALSTOM Power USA, Inc P.O No.: 1350030
STR Order Number: R0529/01 (Unit 2) & R0529/02 (Unit 1)

Circulation:

STRG	Mr. K. Spires
STRGE	Mr. R. Cunningham
USA	Mr. B. Eisma
IPSC	Mr. J. Nelson

ALSTOM Power Ltd
Newbold Road
Rugby, Warwickshire
CV21 2NH England
Tel.: +44 (0) 1788 577111
Fax: +44 (0) 1788 531700
www.alstom.com

Registered Office:
Newbold Road
Rugby, Warwickshire
CV21 2NH
Registered in England No. 4347573

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1. SUMMARY OF PROJECT

This is the Progress / Status Report covering the activities regarding the retrofit of the two (2) turbines unit # 1 & 2 in the Intermountain Power Plant. For the retrofit, a new steam path for the HP Turbine will be designed and implemented in both turbines Intermountain unit # 1 & 2 (unit 2 being first). New HP Rotors and Inner Cylinders will be manufactured and installed.

Each turbine retrofit consists of:

- Design and supply of HP rotor with 8 stages of rotating blading,
- Design and supply of fixed blade diaphragms (8 stages in total),
- Design and supply of HP Inner Cylinder,
- Design and supply of balance gland casing and sealing rings (for inlet end),
- Design and supply of stellited inlet liner assemblies (fitted into existing outer casing),
- Design and supply of miscellaneous shims and packing pieces, etc.,
- High speed balancing of the new rotor assembly,
- HP Heater Connection Assembly
- Transportation Cradle for assembled inner cylinder module complete with rotor,
- Technical Support for the installation of the new components,
- Design and supply of special tools or lifting equipment that differ from those required for the existing equipment,
- Supply of Heat Balance Diagrams, etc.
- Witness of post upgrade performance tests,
- Certification, QA documentation, modifications to service manuals, installation & maintenance drawings.

This report covers the period from 1st July 2002 – 31st July 2002

Unit #2: All items delivered, installed and unit back in service

Unit #1: All items on schedule

2. LIST OF DELAYS**COMPONENT****ACTIONS**

No Delays

3. ACTUAL STATUS

3.1. Turbine Parts

3.1.1 Engineering for Rotating parts

All Complete

3.1.2 Engineering for Stationary parts

All Complete.

3.1.3 Manufacturing of Rotating parts

Unit 1 HP Rotor is finish machined and ready for blade assembly which is due to commence in week 37.

HP Moving Blades – due to be completed week 37

3.1.4. Manufacturing of Stationary parts

Unit 1 components

HP Inner Cylinder – machining in progress due to complete week 38

HP Cylinder Bolting – machining due to be completed week 32

HP Inlets - complete

HP Inlet Gland - machining ongoing due to complete week 33

Gland Bolting - complete

HP Shaft Gland Rings – complete

HP Diaphragms – material available, due to commence first week 36

HP Fixed Blades – manufacture ongoing, due to complete last week 36

HP Diaphragm Gland Rings – due to be completed week 34

3.2 Any Other Parts

3.2.1 Engineering for any other parts

Completed

3.2.2 Manufacturing of any other parts

Heater Connection Materials – all available

3.3 Installation

None

3.4 Quality Assurance

Nothing to report.

3.5 Personnel

Kevin Spires has replaced Adrian Bramley as Project Manager for STR in Rugby for the remainder of the contract.

3.6 Upcoming Highlights

None.

4. ADDITIONAL TOPICS

Extra design work carried out to evaluate what happens if HP Heaters are out of service. IPSC have agreed to fund this at a total cost of \$4,250.

For Unit 1 the HP Fixed Blades on Stages 1 & 6 will be modified to reduce flow by 1% as agreed with IPSC. This has no effect on the programme.

5. LIST OF ATTACHMENTS

Unit 1 Programme with Milestone dates

6. ABBREVIATIONS

AP	ALSTOM Power
HP	High Pressure



INVOICE

SOLD TO : Intermountain Power Service Corp.
850 W. Brush Wellman Road
DELTA, UTAH 84624-9546

Attn.: Ms. Sheila Bronson. Accounting

SHIP TO : Intermountain Power Service Corp.
Delta Power Plant
Delta, Utah

REMIT TO: ALSTOM PGI
P. O. BOX 70586
CHICAGO, IL. 60673

WIRE TO:
Bank One, NA
1 Bank One Plaza
CHICAGO, IL 60670
ABA # 071000013
ACCOUNT # 5709636

NETTING CODE: USPGE

CUSTOMER #: 314870
CUSTOMER P.O. #: 01-45510
CHANGE ORDER #: -

INVOICE #: 51483
INVOICE DATE: 10/21/2002
ALSTOM JOB #: 1350030

DESCRIPTION

TOTAL PRICE

To be approved by Mr. Phong Do

This invoice is for the 3 rd. milestone for unit 1. Payment due on completion of rotor blading. Photo's submitted 10/21/02.

Payment due 20% of \$4,170,000.00=

\$834,000.00

	Unit 2	Unit 1
<u>Contract Value:</u>	<u>\$5,245,000.00</u>	<u>\$4,170,000.00</u>
Previously Invoiced :	\$5,245,000.00	\$1,668,000.00
This Invoice:	0.00	\$834,000.00
Total Invoiced:	\$5,245,000.00	\$2,502,000.00

PAYMENT TERMS: 100% net 30 days.

INVOICE TOTAL: **\$834,000.00**

ANY QUESTIONS, PLEASE CONTACT:

Wim F.Eisma

TEL . # : (804)-763-7715

Fax . # : (804)-763-3818

ALSTOM power Inc.

Steam Turbine Segment
Retrofit Project Execution
2800 Waterfordlake Drive
Midlothian, VA 23112

Telephone : (804) 763-7000

N:\Curren\Projects\ES21\2001-02 U1 HP Turbine Retrofit\PTD\Acc Corresponding\01.51483.XLS\NA\EMP

IP7008207

**Delta 1+2, Intermountain Power Service Corp.
Invoice/Payment Schedule**

Paymnt. #	Date/Event due	Payment due	Invoice Amount	Invoice #	Inv. Date	Due Date	Rec'd. Date	Days Late	LPI 1.5%/Mnth.	TOTAL INVOICED
<u>Delta # 2 PAYMENTS</u>										
D2/01	HP forging order(5/01)	20%	\$1,049,000.00	38449	05/02/01	06/01/01	06/04/01	3	\$17,308.50	
D2/02	Start rotor machining (8/01)	20%	\$1,049,000.00	40758	08/14/01	09/13/01	09/12/01	-1		
D2/03	Complete blading (12/01)	20%	\$1,049,000.00	44369	01/15/02	02/14/02	02/01/02	-13		
D2/04	Complete rotor testing (1/02)	20%	\$1,049,000.00	44779	01/29/02	02/28/02	02/20/02	-8		
D2/05	Equipm. On Site (3/02)	10%	\$524,500.00	45337	02/21/02	03/23/02	04/17/02	25	\$14,423.75	
D2/06	1st. Synchr. (net 60 days)	10%	\$524,500.00	46593	04/05/02	06/04/02	06/14/02	10	\$2,622.50	
	Total Delta unit 2		\$5,245,000.00							
	Total Late Payment Int. due								\$34,354.75	
	Total Invoiced unit 2									\$5,245,000.00
	Total Remaining unit 2									0.00
<u>Changes</u>										
	Heaters out of service study	100%	\$4,250.00	50055	08/27/02	09/26/02	10/15/02	18	\$38.25	
	Performance Bonus unit 2	100%	\$90,000.00	50056	08/27/02	09/26/02	10/01/02	4	\$153.06	
	Deduct for Contr. Rotor corr.	100%	(\$13,472.00)	50056	08/27/02	09/26/02	10/01/02			
<u>Delta # 1 Payments</u>										
D1/01	HP forging order (5/02)	20%	\$834,000.00	43360	11/28/01	12/28/02	12/21/01	-7		
D1/02	Start rotor machining (9/02)	20%	\$834,000.00	47931	05/29/02	07/01/02	07/19/02	18	\$7,506.00	
D1/03	Complete blading (11/02)	20%	\$834,000.00	51483	10/21/02	11/20/02				
D1/04	Complete rotor testing (12/02)	20%	\$834,000.00							
D1/05	Equipm. On Site (3/03)	10%	\$417,000.00							
D1/06	1st. Synchr.(net 60 days)	10%	\$417,000.00							
	Total Delta unit 1		\$4,170,000.00							
	Total Late Payment Int. due									
	Total Invoiced unit 1									2,502,000.00
	Total Remaining unit 1									1,668,000.00

LPI. Late Pay Interest. 1.5%/Mnth.	1.50%
Original Contract Value	
Unit 2	\$5,245,000.00
Unit 1	\$4,170,000.00
Adder for heater study	\$4,250.00
Adder for perf. Bonus unit 2	\$90,000.00
Deduct for Contr. Rotor Correct.	-\$13,472.00
Revised Total	\$9,495,778.00

REFERENCE LIST – OEM & POWER GENERATION

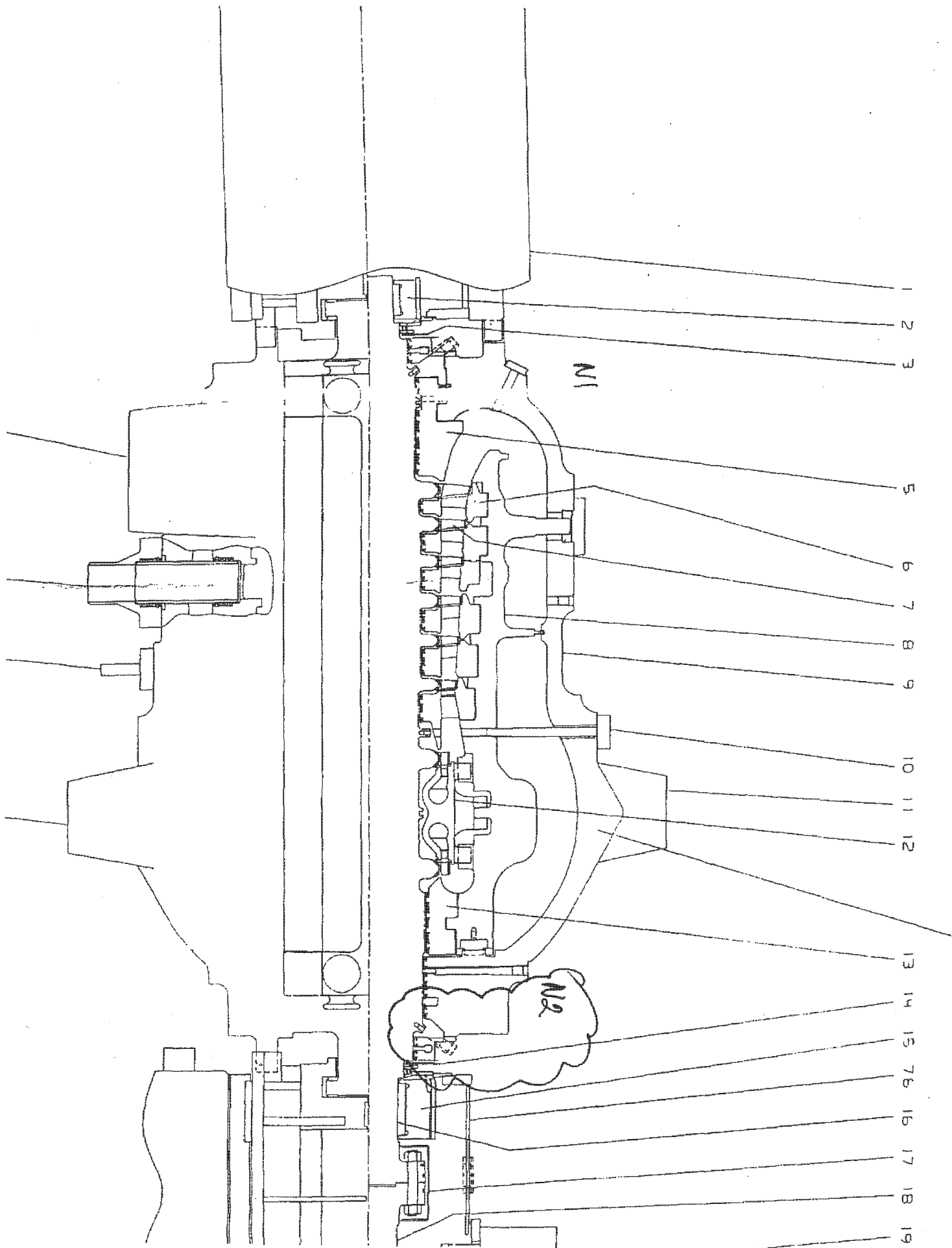
OEM's

Mitsubishi Electric	Generator Core Bolting
Toshiba	Reactor Feed Pump Turbine
Kawasaki	Vibration Units and Presses
Hyundai	Dock Crane Cablewinders
Samsung	Dock Crane Cablewinders
Hitachi	Injection Clamping Equipment
Bellelli	Heat Exchangers
Alfa Laval	Heat Exchangers
Kelly and Lewis	Pumps
Fiat	Presses
Favelle Favco	Cranes
Danieli	Presses
ANI	Crushers / Mills
Svedala	Mills / Screens
Sulzer	Boiler Feed Pumps

POWER GENERATION

Tarong Energy	Generator Winding Jacks
Mitsubishi Electric	Generator Rotor Core Bolting
AES	Boiler Feed Pumps
Toshiba	Reactor Feed Pump Turbines
Pacific Power	Boiler Feed Pump Suction
Delta Energy	HP Heater Manway Doors
Virginia Power	Westinghouse Steam Valves
Maquarie Generation	Shaft Raising Gear
Alstom	Coupling Hole Boring
Stanwell Corporation	Boiler Sling Rod Analysis
CS Energy	Turbine Casings
Iberdrola	GE Turbine Casings
Westinghouse Electric	Reactor Pressure Vessel Covers
Dominion Power	Reactor Coolant Pumps
KOSPO	Gas Turbine Casings

In addition to this, Technofast Hydraulic Bolting systems have been used with great success over the past fourteen years within the Mining, Steel, Oil and Gas, Refining and Civil industries, details of which can be provided upon request.



SEE 0070000 (A) (1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19)

From: Phong Do
To: Alan.holmes@power.alstom.com; kevin.spires@power.alstom.com
Date: 10/16/02 1:51PM
Subject: HP Rotor End Balance

Dear Alan/Kevin,

One of the Unit 2 HP retrofit startup major concerns was the offset between the rotor-N2-End Balance Hole Center and the N2 Casing Access Hole Centers. The center lines of the N2 casing holes were about 1/2" to 3/4" off (lower) relative to the N2 rotor hole's center lines. The N1 center lines were lined up good.

After some failures, our performance group finally created some flexible tools and was able to install the end balance weights. This process took a significant bite out of the startup time.

Please provide recommendations to correct the above concern.

Thanks.

Phong Do
Day Phone: (435)864-6475
Fax: (435)864-0775
Email: Phong-D@IPSC.Com

CC: bill.eisma@power.alstom.com; James Nelson

IP7008211



Bill Eisma, Project Director
Alstom Power, Inc.
2800 Waterford Lake Drive,
Midlothian,
VA, 23112
USA

15th July 2002

ALSTOM Power USA, Inc Ref : 1350030
IPSC Ref: 01-45510
Rugby Works Order Ref: 760R0529/02/001/001

Manufacturing Works: Rugby
Power Station Name: Intermountain Unit 1
Project Manager: Leigh Thornton

MONTHLY CONTRACT STATUS REPORT

PLANT: Intermountain 1 HP Retrofit for IPSC

Your Purchase Order Number : 100318 OG.

COMMITMENT: HP Inner Assembly + Rotor - Week 0309 (28th February 2003 – on site)

FORECAST: HP Inner Assembly + Rotor - Week 0303 (17th January 2003 – on site)

Current Status

This report details progress up to 15th July 2002.

See attached programme for details.

Newbold Road
Rugby, Warwickshire
CV21 2NH
England
Tel: +44 (0) 1788 577111
Fax: +44 (0) 1788 531700

ALSTOM Power UK Ltd.
Registered Office:
Lindum House
11 Sewell Road, Lincoln
LN2 5RY
Registered in England No. 476835

IP7008212



Engineering

All complete.

Salient Material

<u>Item</u>	<u>HP Status</u>
HP Inner Cylinder Casing	Order placed (PO 302894) purchased from Zamec in Poland, Casting complete week 0220. Machining forecast complete week 0233 (to be machined in-house).
Rotor	Forging purchase order (PO 300946) placed on Saarschmiede in Germany. Forging complete. Pre blade machining commenced Overspeed week 0242.
Diaphragms	Diaphragms forecast complete week 0242 to 0245. Last material to Tees Components (for roughing out). Complete.
Fixed Blades	Materials on stock. Completion due for weeks 0233 to 0236.
Moving Blades	Material on order (PO 304787) from Corus for stages 1,3,4,5,6,7&8. Material received. Stage 2 material from stock. Forecast completion date weeks 0234 to 0237.
Bolting, cylinder nimonic	Material order placed on Enpar due in week 0213 (PO 303083). Received. Paperwork cleared. Complete.
Bolting, gland	Complete.
Heater connection materials	Seal ring carrier forging (PO 305310). Received. Machined complete. Retaining nut forging (PO 304912) Received. Machined complete. 10" NS Pipe (PO 305860) on Eurotube. Received. Order placed on Grevilles (PO 3-6430) for Stelliting. Complete. Piston rings (PO 303807). Received.

Newbold Road
Rugby, Warwickshire
CV21 2NH
England
Tel: +44 (0) 1788 577111
Fax: +44 (0) 1788 531700

ALSTOM Power UK Ltd.
Registered Office:
Lindum House
11 Sewell Road, Lincoln
LN2 5RY
Registered in England No. 476835

IP7008213

<u>Item</u>	<u>HP Status</u>
Inlet Materials	Liners ordered on Grevilles due week 0201. All other materials received. Machining order placed on MGM. Complete.
Rotor Cooling Assembly	Liner ring and seal ring carrier - all complete. Flange pipe (PO 304702). Received. All complete. Piston rings ordered on Cross Mfg. Received.
Diaphragm Gland Rings	Due for completion at week 0230. Currently at TurboCare in the USA.
Shaft Gland Rings.	Material due in from Firth Rixon (PO 306208 #3) week 0150. Received. Complete.
Inlet Gland Box	Order placed on Innosman (PO 306054). Received. Forecast machined complete week 0234.
Gland box deflector	Order placed on Innosman (PO 306054) Received. Forecast machined complete week 0233.
Lifting gear	Received.
Shipping frame	Order number (PO 305656 #1). Received.
Bolt measuring gear	N/A
Instrumentation.	Site purchase.
Outer shell interface details	Raw material for the diffuser, connection sleeve, shear ring and retaining ring. Received. All clear. Machining order placed on Nansons PO 307919. Requested week 0232.



Possible Risks

Best regards,

Leigh Thornton.

Newbold Road
Rugby, Warwickshire
CV21 2NH
England
Tel: +44 (0) 1788 577111
Fax: +44 (0) 1788 531700

ALSTOM Power UK Ltd.
Registered Office:
Lindum House
11 Sewell Road, Lincoln
LN2 5RY
Registered in England No. 476835

IP7008215



Bill Eisma, Project Director
Alstom Power, Inc.
2800 Waterford Lake Drive,
Midlothian,
VA, 23112
USA

12th June 2002

ALSTOM Power USA, Inc Ref : 1350030
IPSC Ref: 01-45510
Rugby Works Order Ref: 760R0529/02/001/001

Manufacturing Works: Rugby
Power Station Name: Intermountain Unit 1
Project Manager: Leigh Thornton

MONTHLY CONTRACT STATUS REPORT

PLANT: Intermountain 1 HP Retrofit for IPSC

Your Purchase Order Number : 100318 OG.

COMMITMENT: HP Inner Assembly + Rotor - Week 0309 (28th February 2003 – on site)

FORECAST: HP Inner Assembly + Rotor - Week 0303 (17th January 2003 – on site)

Current Status

This report details progress up to 12th June 2002.

7See attached programme for details.

Newbold Road
Rugby, Warwickshire
CV21 2NH
England
Tel: +44 (0) 1789 577111
Fax: +44 (0) 1789 531700

ALSTOM Power UK Ltd.
Registered Office:
Lindum House
11 Sewell Road, Lincoln
LN2 5RY
Registered in England No. 476835

IP7008216



Engineering

All complete.

Salient Material

<u>Item</u>	<u>HP Status</u>
HP Inner Cylinder Casing	Order placed (PO 302894) purchased from Zamec in Poland, Casting forecast complete week 0220. Machining forecast complete week 0233 (to be machined in-house).
Rotor	Forging purchase order (PO 300946) placed on Saarschmiede in Germany. Forging forecast completed. Overspeed week 0241.
Diaphragms	Diaphragms forecast complete week 0242 to 0245. Last material to Tees Components (for roughing out). Complete.
Fixed Blades	Materials on stock. Completion due for weeks 0233 to 0236.
Moving Blades	Material on order (PO 304787) from Corus for stages 1,3,4,5,6,7&8. Material received. Stage 2 material from stock. Forecast completion date weeks 0229 to 0232.
Bolting, cylinder nimonic	Material order placed on Enpar due in week 0213 (PO 303083). Received. Paperwork cleared. Forecast machined complete by week 0229.
Bolting, gland	Complete.
Heater connection materials	Seal ring carrier forging (PO 305310). Received. Machined complete. Retaining nut forging (PO 304912) Received. Machined complete. 10" NS Pipe (PO 305860) on Eurotube. Received. Order placed on Grevilles (PO 3-6430) for Stelling. Complete. Piston rings (PO 303807). Received.

Newbold Road
Rugby, Warwickshire
CV21 2NH
England
Tel: +44 (0) 1788 577111
Fax: +44 (0) 1788 531700

ALSTOM Power UK Ltd.
Registered Office:
Lindum House
11 Sewell Road, Lincoln
LN2 5RY
Registered in England No. 476835

IP7008217



<u>Item</u>	<u>HP Status</u>
Inlet Materials	Liners ordered on Grevilles due week 0201. All other materials received. Machining order placed on MGM. Complete.
Rotor Cooling Assembly	Liner ring and seal ring carrier - all complete. Flange pipe (PO 304702). Received. All complete. Piston rings ordered on Cross Mfg. Received.
Diaphragm Gland Rings	Due for completion at week 0230.
Shaft Gland Rings.	Material due in from Firth Rixon (PO 306208 #3) week 0150. Received. Due for completion at week 0225.
Inlet Gland Box	Order placed on Innosman (PO 306054). Received. Forecast machined complete week 0233.
Gland box deflector	Order placed on Innosman (PO 306054) Received. Forecast machined complete week 0233.
Lifting gear	Received.
Shipping frame	Order number (PO 305656 #1). Received.
Bolt measuring gear	N/A
Instrumentation.	Site purchase.
Outer shell interface details	Raw material for the diffuser, connection sleeve, shear ring and retaining ring. Received. All clear. Machining order placed on Nansons PO 307919. Requested week 0232.

Newbold Road
Rugby, Warwickshire
CV21 2NH
England
Tel: +44 (0) 1788 577111
Fax: +44 (0) 1788 531700

ALSTOM Power UK Ltd.
Registered Office:
Lindum House
11 Sewell Road, Lincoln
LN2 5RY
Registered in England No. 476835

IP7008218



Possible Risks

During the past month our factory has been re-scheduling the workload it currently has. The result of this re-scheduling has moved the ex-works date to 20th December 2002.

However, the retrofit is still early to requirement dates.

Best regards,

Leigh Thornton.

Newbold Road
Rugby, Warwickshire
CV21 2NH
England
Tel: +44 (0) 1788 577111
Fax: +44 (0) 1788 531700

ALSTOM Power UK Ltd.
Registered Office:
Lindum House
11 Sewell Road, Lincoln
LN2 5RY
Registered in England No. 476835

IP7008219



**INTERMOUNTAIN
NOTIFICATION OF INSPECTION**

To:- James Nelson/Phong Do

IPSC

FAX No.: 00 1 435 864 6670

TEL. No.: 00 1 435 864 6464

From :- Gary Randle

Project Support Group

RUGBY

FAX No.: 00 44 1788 531281

TEL. No.: 00 44 1788 531957

Notification Reference: Int 004

DATE 10/10/2002

We confirm that the equipment detailed below is ready for inspection in line with the Contract.

EQUIPMENT DETAILS

Equipment Description : HP ROTOR

Alstom Power (UK) Ltd. PO No. :

Type of Inspection and Test : Overspeed test

COMPANY DETAILS

Company : Alstom Power Ltd.

Inspection Location : Willans Works
Rugby
UK

Inspection Date / Time : Wednesday 20th November 2002

Contact : Gary Randle

TEL No. / FAX No. : 00 44 1788 531957/00 44 1788 531281

Additional Information :

BUYER/SQR/OWNERS RESPONSE

Please confirm the receipt of the notification and advise whether the your representative will/will not * attend the inspection detailed (* delete as applicable).

Please return to Fax No. +44 (0) 1788 531281 or e-mail to gary.randle@power.alstom.com

SIGNED:-

DATE:-

IP7008220

$\alpha\beta\chi\delta$

Bill Eisma, Project Director
Alstom Power, Inc.
2800 Waterford Lake Drive,
Midlothian,
VA, 23112
USA

10th May 2002

ALSTOM Power USA, Inc Ref : 1350030
IPSC Ref: 01-45510
Rugby Works Order Ref: 760R0529/02/001/001

Manufacturing Works: Rugby
Power Station Name: Intermountain Unit 1
Project Manager: Leigh Thornton

MONTHLY CONTRACT STATUS REPORT

PLANT: Intermountain 1 HP Retrofit for IPSC

Your Purchase Order Number : 100318 OG.

COMMITMENT: HP Inner Assembly + Rotor - Week 0309 (28th February 2003 – on site)

FORECAST: HP Inner Assembly + Rotor - Week 0247 (22nd November 2002 – on site)

Current Status

This report details progress up to 10th May 2002.

See attached programme for details.

Newbold Road
Rugby, Warwickshire
CV21 2NH
England
Tel: +44 (0) 1788 577111
Fax: +44 (0) 1788 531700

ALSTOM Power UK Ltd.
Registered Office:
Lindum House
11 Sewell Road, Lincoln
LN2 5RY
Registered in England No. 476835

IP7008221

$\alpha\beta\chi\delta$

Engineering

All complete.

Salient Material

<u>Item</u>	<u>HP Status</u>
HP Inner Cylinder Casing	Order placed (PO 302894) purchased from Zamec in Poland, Casting forecast complete week 0220. Machining forecast complete week 0233 (to be machined in-house).
Rotor	Forging purchase order (PO 300946) placed on Saarschmiede in Germany. Forging forecast completed. Overspeed week 0239.
Diaphragms	Diaphragms forecast complete week 0235 to 0236. Last material to Tees Components (for roughing out). Complete.
Fixed Blades	Materials on stock. Completion due for weeks 0224 to 0227.
Moving Blades	Material on order (PO 304787) from Corus for stages 1,3,4,5,6,7&8. Material received. Stage 2 material from stock. Forecast completion date weeks 0229 to 0232.
Bolting	Material order placed on Enpar due in week 0213 (PO 303083). Received. Paperwork to clear. Forecast machined complete by week 0229.
Heater connection materials	Seal ring carrier forging (PO 305310). Received. Machined complete. Retaining nut forging (PO 304912) Received. Machined complete. 10" NS Pipe (PO 305860) on Eurotube. Received. Order placed on Grevilles (PO 3-6430) for Stelliting. Complete. Piston rings (PO 303807). Received.
Inlet Materials	Liners ordered on Grevilles due week 0201. All other materials received.

$\alpha\beta\chi\delta$

<u>Item</u>	<u>HP Status</u>
	Machining order placed on MGM. Complete.
Rotor Cooling Assembly	Liner ring and seal ring carrier - all complete. Flange pipe (PO 304702). Received. All complete. Piston rings ordered on Cross Mfg. Received.
Diaphragm Gland Rings	Due for completion at week 0226.
Shaft Gland Rings.	Material due in from Firth Rixon (PO 306208 #3) week 0150. Received. Due for completion at week 0224.
Inlet Gland Box	Order placed on Innosman (PO 306054). Received. Forecast machined complete week 0233.
Gland box deflector	Order placed on Innosman (PO 306054) Received. Forecast machined complete week 0233.
Lifting gear	Received.
Shipping frame	Order number (PO 305656 #1). Received.
Bolt measuring gear	N/A
Instrumentation.	Site purchase.
Outer shell interface details	Raw material for the diffuser, connection sleeve, shear ring and retaining ring. Received. All clear. Machining order placed on Nansons PO 307919. Requested week 0232.

$\alpha\beta\chi\delta$

Possible Risks

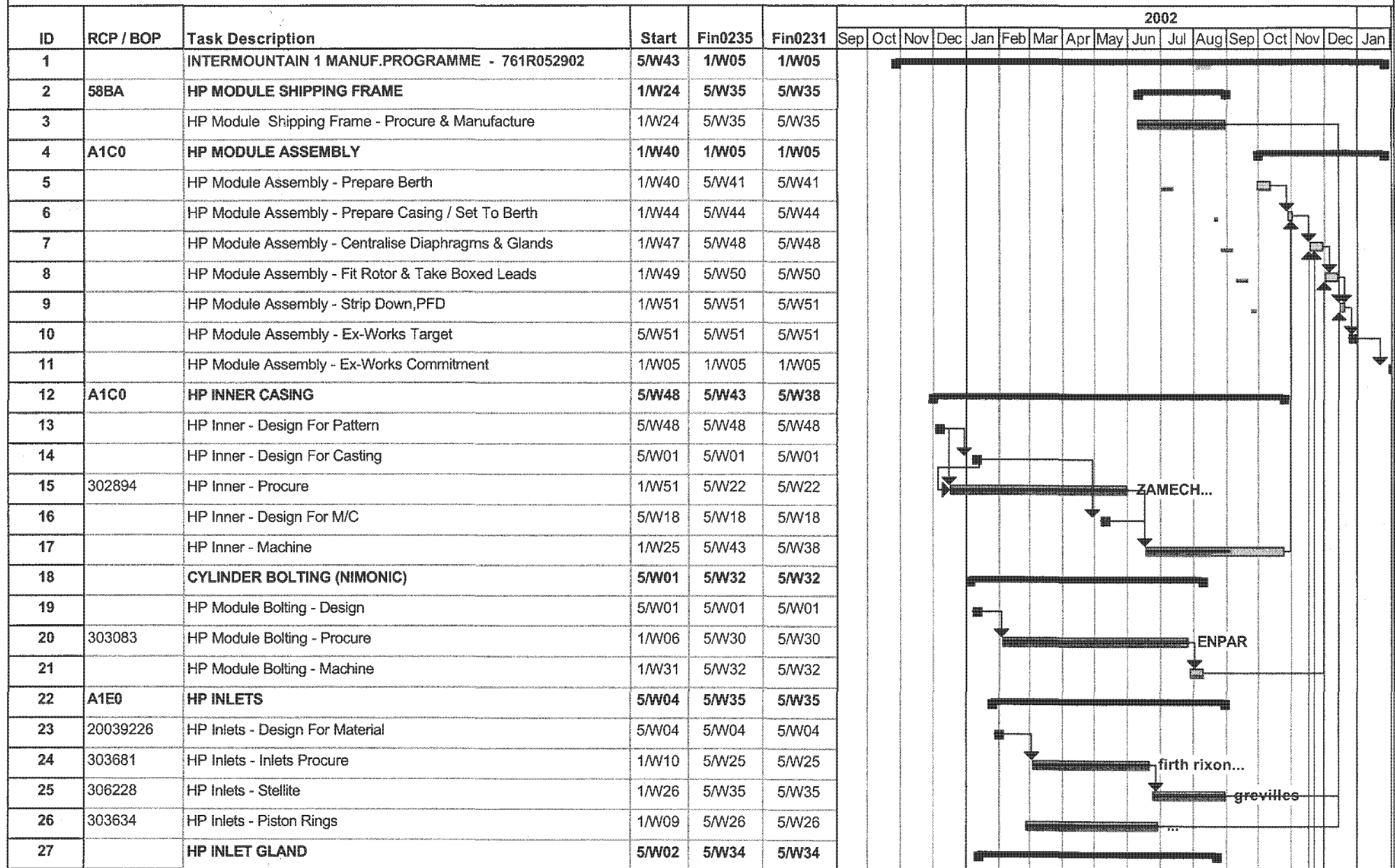
The retrofit is still very early to requirement dates. During the past month there have been no further effect to the programme due to the blading department. However, we will continue to keep an eye on this situation.

Best regards,

Leigh Thornton.

**INTERMOUNTAIN UNIT 1
MANUFACTURING PROGRAMME**

0130

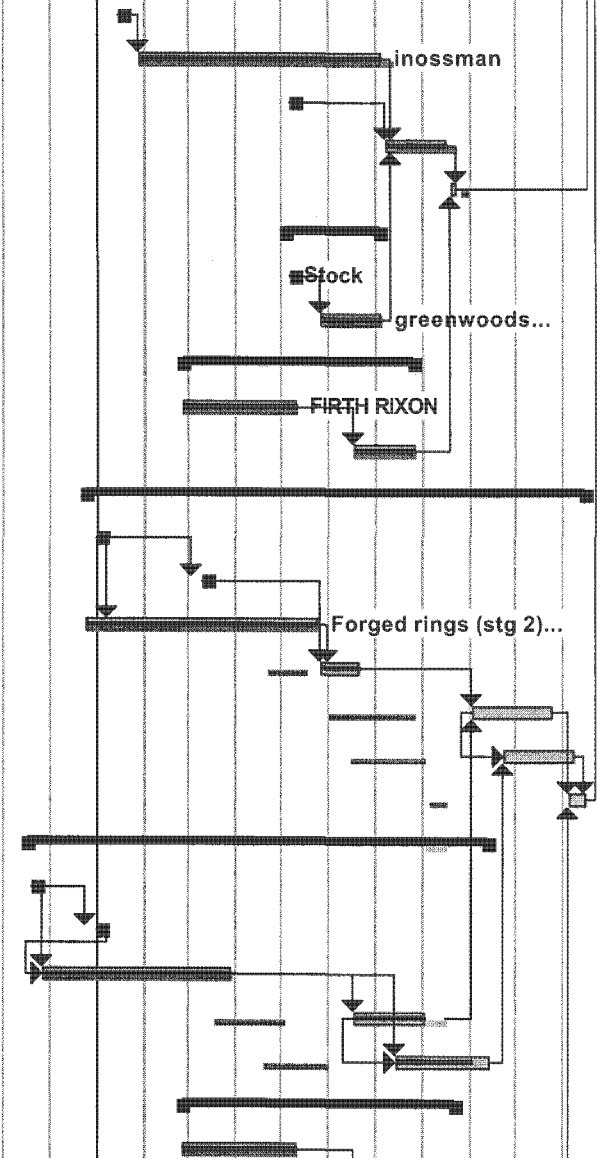


IP7008225

**INTERMOUNTAIN UNIT 1
MANUFACTURING PROGRAMME**

0130

ID	RCP / BOP	Task Description	Start	Fin0235	Fin0231	2002											
						Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
28		HP Inlet Gland - Design For Casting	5/W02	5/W02	5/W02												
29	306054	HP Inlet Gland - Procure	1/W05	5/W27	5/W27												
30		HP Inlet Gland - Design For Machining	5/W18	5/W18	5/W18												
31		HP Inlet Gland - Machine	1/W28	5/W33	5/W33												
32		HP Inlet Gland - SubAssy	1/W34	5/W34	5/W34												
33		GLAND BOLTING	5/W18	5/W27	5/W27												
34		HP Inlet Gland Bolting - Design	5/W18	5/W18	5/W18												
35	306121	HP Inlet Gland Bolting - Machine	1/W22	5/W27	5/W27												
36	A1G*	HP SHAFT GLAND RINGS (INL&EXH)	1/W09	5/W30	5/W30												
37	306208	HP Shaft Gland Rings - Procure	1/W09	5/W19	5/W19												
38		HP Shaft Gland Rings - Machine	1/W25	5/W30	5/W30												
39		HP DIAPHRAGMS	1/W52	5/W46	5/W46												
40		HP Diaphragms - Design For Plate sizes	5/W52	5/W52	5/W52												
41		HP Diaphragms - Design For Pre - M/C (Rims & Centres)	5/W10	5/W10	5/W10												
42	304768	HP Diaphragms - Procure Material	1/W52	5/W21	5/W21												
43		HP/IP Diaphragms - Machine	1/W22	5/W25	5/W25												
44		HP Diaphragms - Manufacture (first)	1/W36	5/W43	5/W43												
45		HP Diaphragms - Manufacture (last)	1/W39	5/W45	5/W45												
46		HP Diaphragms - SubAssy	1/W45	5/W46	5/W46												
47	A1P*	HP FIXED BLADES	5/W46	5/W37	5/W36												
48		HP Fixed Blades - Design For Procure Wt & Spec	5/W46	5/W46	5/W46												
49		HP Fixed Blades - Design For Procure - Final Blade Sizes	5/W52	5/W52	5/W52												
50	304787	HP Fixed Blades - Procure	1/W48	5/W13	5/W13												
51		HP Fixed Blades - Machine First	1/W25	5/W33	5/W33												
52		HP Fixed Blades - Machine Last	1/W29	5/W37	5/W36												
53	A1P*	HP DIAPHRAGM GLAND RINGS	1/W09	5/W34	5/W34												
54	303496	HP Diaph Gland Seals - Procure	1/W09	5/W19	5/W19												



IP7008226

0130

Manufacturing Project Management

IP7008227

From: <bill.eisma@power.alstom.com>
To: <jim-n@ipsc.com>
Date: 11/14/02 6:58AM
Subject: Intermountain Delta # 1 Progress

Dear Jim,

Attached is the updated progress report for the Delta # 1 retrofit components. There are presently no delays i.e. the delivery to site will be as per Contract.

Regards,

Bill Eisma

(See attached file: November 2002.doc) (See attached file: Intermountain 1 to End Oct 2002.pdf)

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CC: <phong-d@ipsc.com>

IP7008228

INTERMOUNTAIN UNITS 1 & 2HP TURBINE RETROFITHP TURBINE SWALLOWING CAPACITYUNIT 2

Performance Tests were carried out on Unit 2 by PGT in April 2002.

The installed ASME primary flow section, located downstream of the highest pressure feedwater heaters, was acid cleaned during the retrofit outage. On inspection, the internal surface was found to be "scarred and rough". In accordance with ASME guidelines, a value of $\pm 2.5\%$ was selected by PGT as the base uncertainty of the feedwater flow nozzles.

The corrected throttle flow (derived test flow corrected to design pressure and temperature) was determined to be as follows:

	<u>Test 7</u>	<u>Test 8</u>
PGT instrumentation	7,073,880 lb/h	7,077,720 lb/h
Station Instrumentation	6,931,726 lb/h	6,938,958 lb/h

This compared to the requirement of the throttle flow to be in the range 6,900,000 lb/h and 6,975,000 lb/h.

However, ALSTOM were surprised at this apparent high figure (although the $\pm 2.5\%$ uncertainty was noted), and in addition IPSC indicated that they were having to throttle more than they expected at a current (maximum) nominal load of 900 MW. IPSC estimated that the heat rate at 900 MW was approximately 0.1% worse than expected.

In order to better estimate the likely throttle flow (ie trying to reduce the uncertainty surrounding the feedwater flow measurement), ALSTOM carried out a calculation starting from the nominal heat balance diagram TS29247 at 6,900,000 lb/h throttle flow.

Using this as base, the effect of all the measured test conditions was determined - these included:

- Throttle pressure and temperature
- Reheat temperature
- Condenser pressures
- HP feedwater heater inlet and outlet temperatures
- Steam flow to IP rotor cooling,
- Steam flow to feedwater pump turbines.
- Superheater spraywater flow

From this heat balance calculation, the following comparison is made:

INTERMOUNTAIN UNIT 2

		TS29247	TS29247 Corrected to Test conditions		TEST 8 APRIL 2002 PGT Test Measured	Station Instrumentation.
Throttle pressure	psia	2412.2	2389.8	←	2389.8	2398
Throttle temperature	°F	1000.0	993.2	←	993.2	997.5
Throttle flow	lb/h	6,900,000	6,849,904		7,039,852	6,904,554
Steam flow to IP rotor cooling	lb/h	17,115	18,987	←	18,987	
HP exhaust pressure	psia	629.0	630.9		628.2	624.5
IPSV pressure	psia	585.5	587.3		582.3	582.4
IPSV temperature	°F	1000.0	1006.7	←	1006.7	1007.5
IP exhaust pressure	psia	138.8	137.2		137.1	
Flow to FPT's (Total)	lb/h	276,367	282,021	←	282,021	
Condenser A pressure	"Hg	2.99	3.56	←	3.56	3.62
Condenser B pressure	"Hg	2.24	2.80	←	2.80	2.81
Condenser C pressure	"Hg	1.66	2.55	←	2.55	2.44
Condenser hotwell Temperature	°F	114.9	121.2		121.1	
DC outlet temperature	°F	123.5	128.7		128.5	
Heater 1 outlet temperature	°F	162.7	163.5			164.3
Heater 2 outlet temperature	°F	200.6	201.0			204.0
Heater 3 outlet temperature	°F	270.2	270.3			270.7
Heater 4 outlet temperature	°F	303.1	303.1			302.6
Deaerator outlet temperature	°F	350.3	350.3			348.7
Heater 6 inlet temperature	°F		355.7			355.3
Heater 6 outlet temperature	°F	404.0	403.8	←	403.8	
Heater 6 drain temperature	°F		364.9	←		364.9
Heater 7 outlet temperature	°F	488.6	487.6	←	487.6	
Heater 7 drain temperature	°F		412.5	←	412.5	
Heater 8 outlet temperature	°F	552.4	550.9	←	550.9	
Heater 8 drain temperature	°F		497.4	←	497.4	
Superheater spraywater flow	lb/h	0	108288	←	108288	66860
Reheater spraywater flow	lb/h	0	0	←	0	10527
Make up	%	1.0	0.0	←	0.0	
Generator output	MW	973186	969660		981954	982200
Heat rate	Btu/kWh	7683	7707		7886	7750

Note: ← = specified data in heat balance calculation. All other data is as-calculated.

ABXA

From the tabulated data, it can be seen that the calculated throttle flow was 6,849,904 lb/h, but the generator output was only 969,660 kW compared to the test measurement of 981,954 kW. Additional throttle flow must therefore be present to generate this increased power.

Thus the additional throttle flow factor required to generate 981,954 kW is $981,954 / 969,660 = 1.0127$.

This gives a required throttle flow of $1.0127 \times 6,849,904 = 6,936,898$ lb/h.

The actual test was conducted at main steam conditions different to nominal design, therefore a correction factor is required to derive what the throttle flow would have been with design main steam conditions:

$$\text{Flow correction factor} = \frac{2412.2 \times \sqrt{(993.2 + 460)}}{2389.8 \sqrt{(1000 + 460)}} = 1.0070$$

Hence the **estimated** throttle flow for Intermountain Unit 2 at VWO under design main steam conditions is $6,936,898 \times 1.0070 = \mathbf{6,985,456}$ lb/h.

This compares with the PGT corrected flow of 7,077,720 lb/h (ie estimated corrected flow is 1.3% lower than the PGT corrected flow derived from the flowmeter with a nominal uncertainty of $\pm 2.5\%$)

UNIT 1 PROPOSAL

Unit 1 fixed blades are about to be manufactured.

In discussions with IPSC it has been mutually understood that, as the units are limited for the foreseeable future to a maximum load around 900 - 950 MW (including some throttling reserve for rapid load pickup capability), it is desirable for Unit 1 capacity to be reduced compared to that of the installed Unit 2.

This reduction is agreed to be nominally 1% of throttle flow, and will be achieved by modifying the fixed blade throat openings of stage 1 only.

However, to maintain the final feedwater temperature, the fixed blade following the HP steam path extraction has also to be modified. Without this additional modification, the final feedwater temperature would reduce by approximately 1°F.

With these changes to HP stage 1 and 6 fixed blades, the expected throttle flow of Unit 1 (assuming similar as-made nozzle sizes to Unit 2) would be $6,985,456 \times 0.99 = 6,915,600$ lb/h.

Power

Steam Turbines

To: Adrian Bramley
Project Manager, Rugby

cc: Phil Kearney/ File

From: Joyce Moore
STRGT, Rugby

Date: 24th July 2002

Subject: Intermountain- HP heaters out of service

In response to James Nelson's e-mail (dated 12th July 2002), regarding the ability of the Intermountain turbines to tolerate short term operation with HP heaters isolated, a variety of scenarios were assessed. These scenarios were as follows:

- 1) One HP heater string isolated
- 2) All 6 HP heaters isolated
- 3) One top HP heater (e.g. heater 8b) isolated
- 4) Both top HP heaters isolated
- 5) One HP 7 heater isolated
- 6) Both HP 7 heaters isolated
- 7) One HP 6 heater isolated
- 8) Both HP 6 heaters isolated

In addition to determining the LP turbine exhaust flow under these conditions (as was requested), the heater pressures on the steam side of all heaters and the IP exhaust pressure were calculated. The heater pressures were then checked against the design pressures.

The IP exhaust pressure gives an indication of the loading on the latter stages of the IP turbine as well as on the LP turbine stages. This pressure was compared to that given by the predicted performance of the cycle with VWO (see drawing no. TS29247). From Test 8 carried out by PGT in April 2002, it can be seen that the turbines have been run under conditions very similar to those shown on TS29247. This shows the ability of the turbines to tolerate these conditions, although the IP exhaust pressure achieved (137.2 psia) is higher than that previously indicated on the OEM 5% O/P heat balance diagram. (Note: Units 1 & 2 turbines have previously operated at very similar pressure levels during BMCR tests in 1998)

The results showed that under all conditions, the LP exhaust loading was below the design limit of 15,000 lb/ft² per exhaust. Heater pressures also fell within design with

MEMORANDUM

Power Steam Turbines

the exception of the deaerator exceeding its design limit when all 6 HP heaters were isolated at throttle valves wide open (VWO). In all scenarios at VWO however, the IP exhaust pressure exceeded 137.2 psia. Further calculations were carried out in order to find the power output to which the turbines must be limited in order to reduce the IP exhaust pressure a value of 137.2 psia (the maximum normal operating pressure with all heaters in service- subject to review by IPSC/GE).

As a result of the analysis, it is advised that the generator output should be limited to the following when any of the HP heaters are tripped:

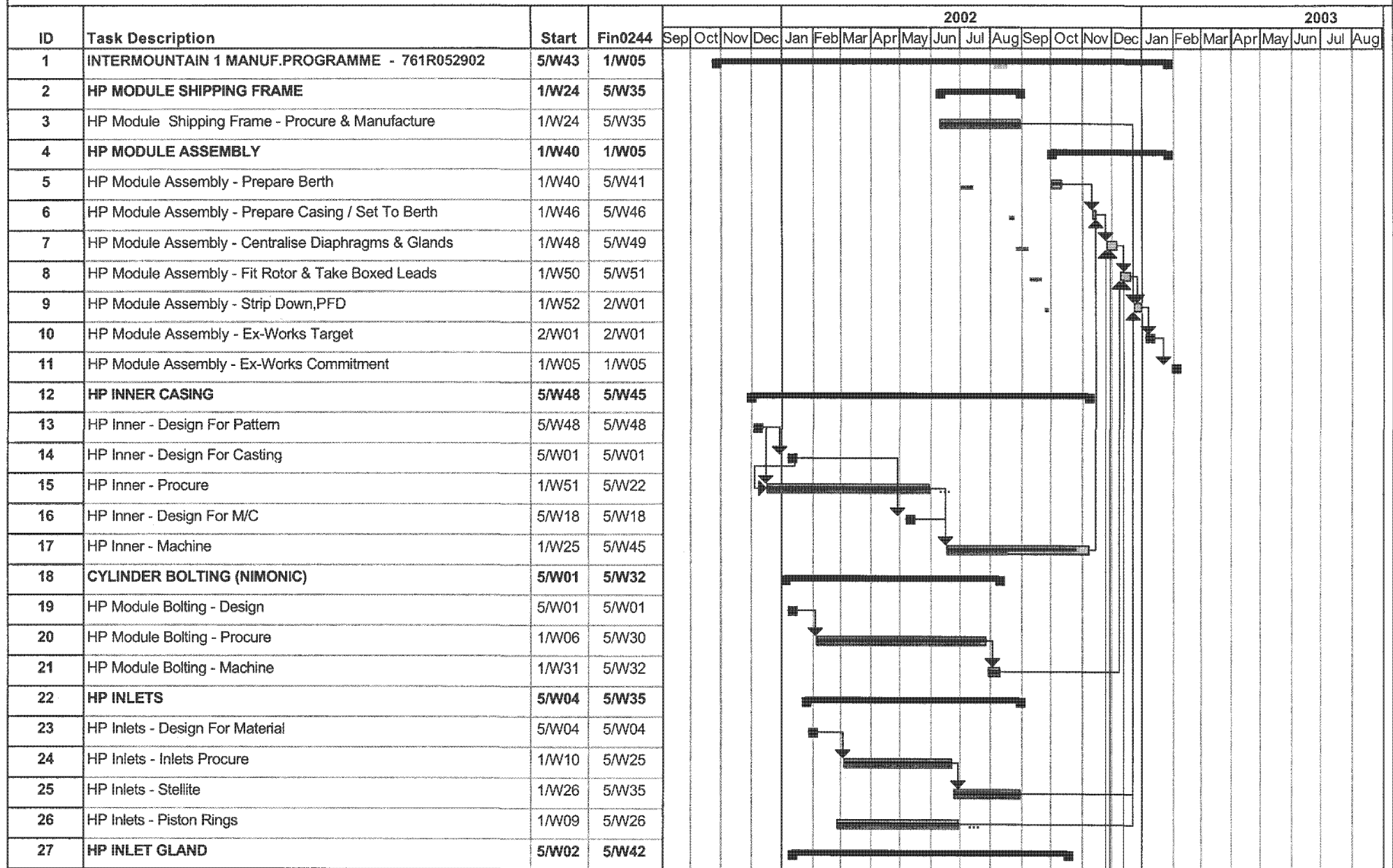
1) One HP heater string isolated	923MW
2) All 6 HP heaters isolated	870MW
3) One top HP heater isolated	956MW
4) Both top HP heaters isolated	942MW
5) One HP 7 heater isolated	962MW
6) Both HP 7 heaters isolated	952MW
7) One HP 6 heater isolated	969MW
8) Both HP 6 heaters isolated	965MW

In order to operate at higher loads, it is recommended that IPSC contact GE in order to obtain the maximum allowable conditions for safe operation of the IP and LP turbines.

Joyce Moore

**INTERMOUNTAIN UNIT 1
MANUFACTURING PROGRAMME**

0130



IP7008234

**INTERMOUNTAIN UNIT 1
MANUFACTURING PROGRAMME**

0130

ID	Task Description	Start	Fin	2002												2003												
				Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	
28	HP Inlet Gland - Design For Casting	5/W02	5/W02																									
29	HP Inlet Gland - Procure	1/W05	5/W27																									
30	HP Inlet Gland - Design For Machining	5/W18	5/W18																									
31	HP Inlet Gland - Machine	1/W28	5/W33																									
32	HP Inlet Gland - SubAssy	1/W42	5/W42																									
33	GLAND BOLTING	5/W18	5/W27																									
34	HP Inlet Gland Bolting - Design	5/W18	5/W18																									
35	HP Inlet Gland Bolting - Machine	1/W22	5/W27																									
36	HP SHAFT GLAND RINGS (INL&EXH)	1/W09	5/W30																									
37	HP Shaft Gland Rings - Procure	1/W09	5/W19																									
38	HP Shaft Gland Rings - Machine	1/W25	5/W30																									
39	HP DIAPHRAGMS	1/W52	5/W47																									
40	HP Diaphragms - Design For Plate sizes	5/W52	5/W52																									
41	HP Diaphragms - Design For Pre - M/C (Rims & Centres)	5/W10	5/W10																									
42	HP Diaphragms - Procure Material	1/W52	5/W21																									
43	HP/IP Diaphragms - Machine	1/W22	5/W25																									
44	HP Diaphragms - Manufacture (first)	1/W36	5/W43																									
45	HP Diaphragms - Manufacture (last)	1/W39	5/W46																									
46	HP Diaphragms - SubAssy	1/W46	5/W47																									
47	HP FIXED BLADES	5/W46	5/W37																									
48	HP Fixed Blades - Design For Procure Wt & Spec	5/W46	5/W46																									
49	HP Fixed Blades - Design For Procure - Final Blade Sizes	5/W52	5/W52																									
50	HP Fixed Blades - Procure	1/W48	5/W13																									
51	HP Fixed Blades - Machine First	1/W25	5/W33																									
52	HP Fixed Blades - Machine Last	1/W29	5/W37																									
53	HP DIAPHRAGM GLAND RINGS	1/W09	5/W34																									
54	HP Diaph Gland Seals - Procure	1/W09	5/W19																									

IP7008235

**INTERMOUNTAIN UNIT 1
MANUFACTURING PROGRAMME**

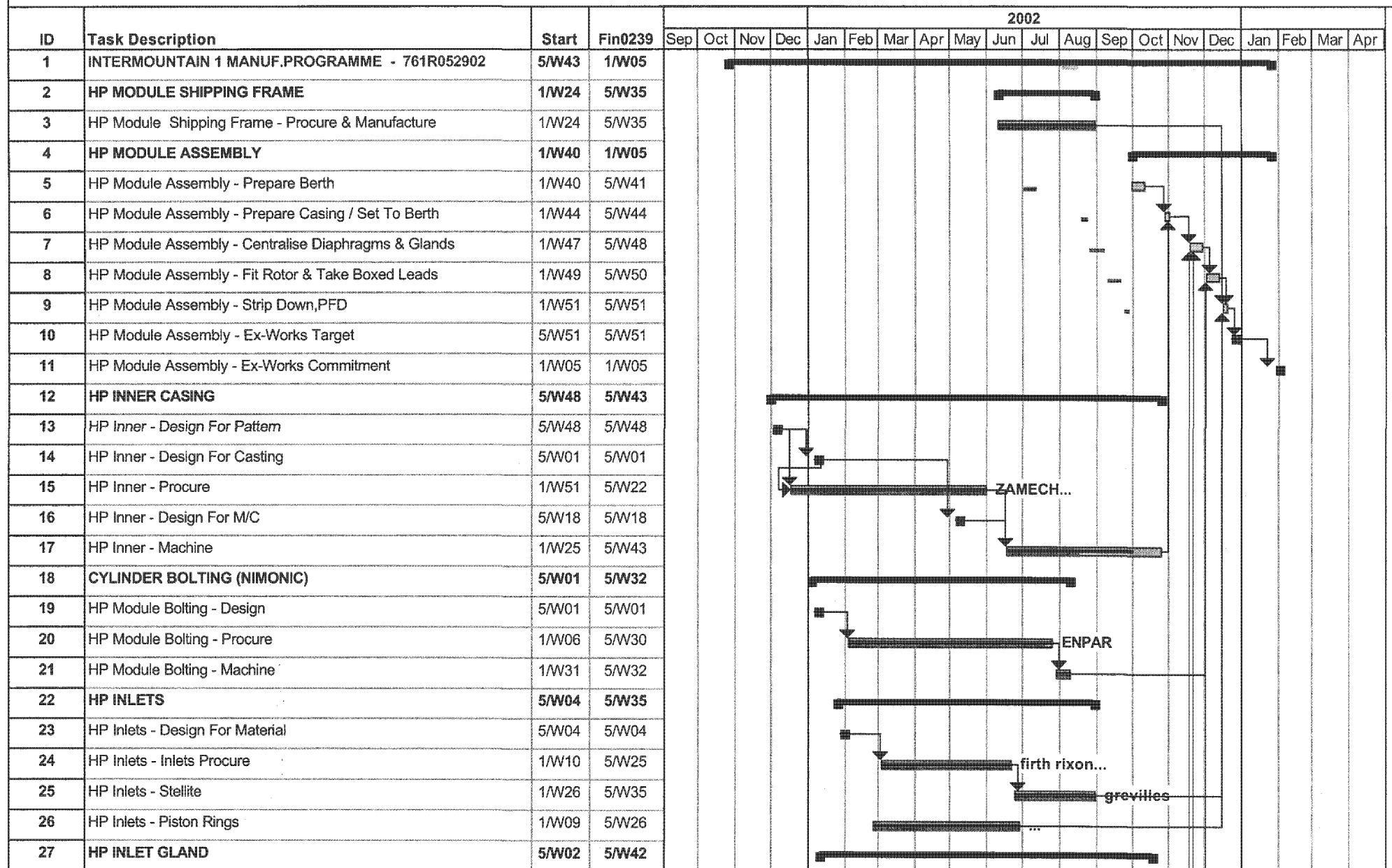
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ID	Task Description	Start	Fin0244	2002												2003											
				Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
55	HP Diaph Gland Seals - Machine	1/W25	5/W34																								
56	HP ROTOR	5/W43	5/W49																								
57	HP Rotor - Design For Forging	5/W43	5/W43																								
58	HP Rotor - Design For Gashing	5/W04	5/W04																								
59	HP Rotor - Procure Forging	1/W48	5/W17																								
60	HP Rotor - Design For M/C	5/W08	5/W08																								
61	HP Rotor - Pre-Blade Machine	1/W26	5/W30																								
62	HP Rotor - Fit Blades & PRD	1/W37	5/W45																								
63	HP Rotor - Turn Shroud.Deburr	1/W46	5/W48																								
64	HP Rotor - Overspeed & PFD	1/W49	5/W49																								
65	HP MOVING BLADES	5/W46	5/W37																								
66	HP Moving Blades - Design For Procure - Wt & Spec	5/W46	5/W46																								
67	HP Moving Blades - Design For Procure Blade Sizes	5/W49	5/W49																								
68	HP Moving Blades - Procure	1/W48	5/W11																								
69	HP Moving Blades - Machine first	1/W28	5/W34																								
70	HP Moving Blades - Machine last	1/W28	5/W37																								

IP7008236

**INTERMOUNTAIN UNIT 1
MANUFACTURING PROGRAMME**

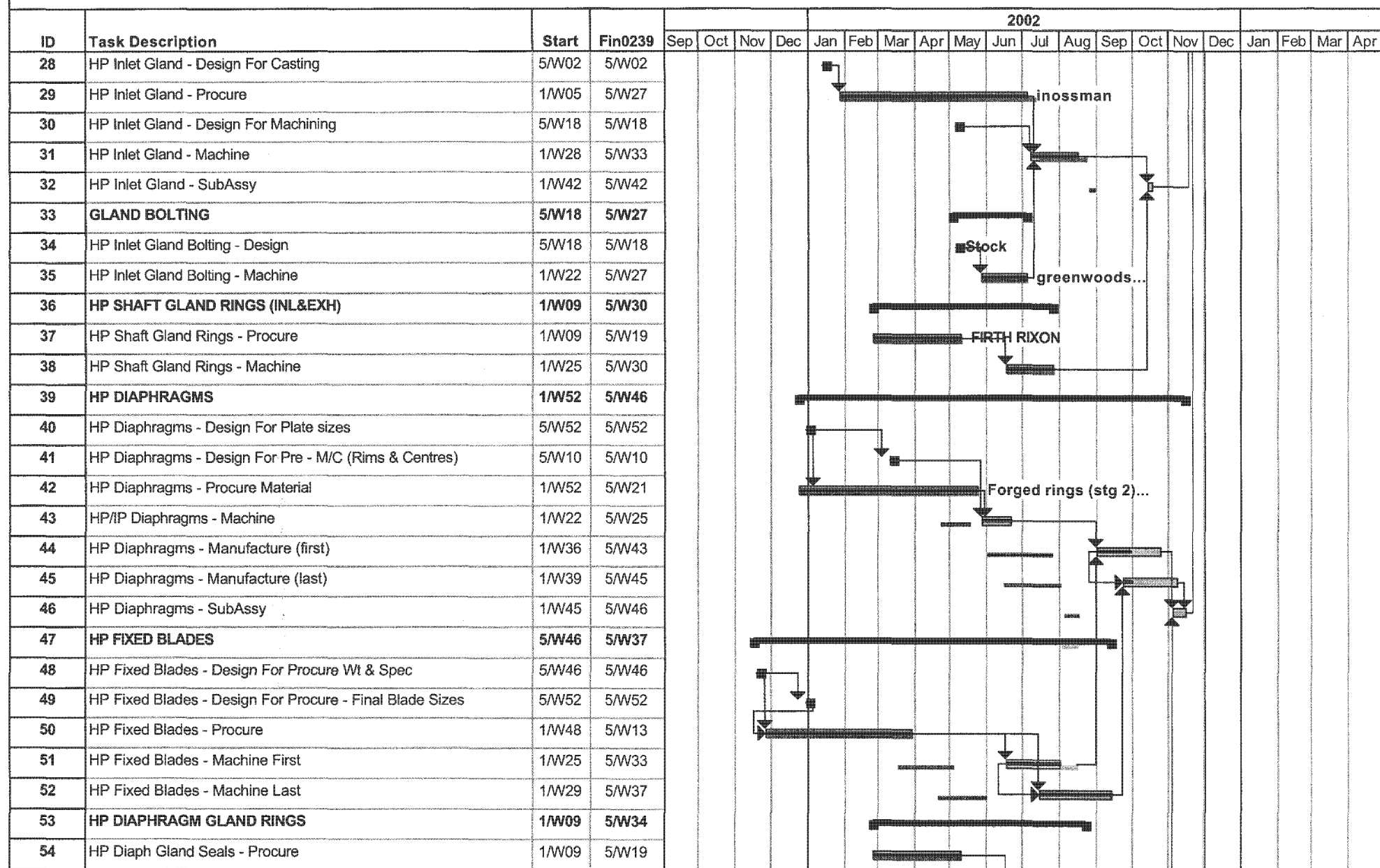
0130



IP7008237

**INTERMOUNTAIN UNIT 1
MANUFACTURING PROGRAMME**

0130



IP7008238

0130

IP7008239

From: <robert.cunningham@power.alstom.com>
To: <phong-d@ipsc.com>
Date: 1/17/03 4:11AM
Subject: Intermountain - Balance Weight Tapping Details

Hello Phong

Please find attached extracts showing :-

- the location of the balance weight planes relative to the end glands.	(See attached file: int-ga.tif)
The dimension of 12" is approximate. In Rugby we do not have any details showing the access holes on the cover glands (you may need to make this longer)	
- the tapping for the balance weight on the rotor	(See attached file: int-rotor.tif)

I hope that this is enough information for you. If not you can discuss this further with Wally next week.

Best regards

Rob C

CC: <wally.falconer@power.alstom.com>,
<RUGWW.TEGMail@test.alstom.com>, <kevin.spires@power.alstom.com>

IP7008240

From: <gary.randle@power.alstom.com>
To: <PHONG-D@ipsc.com>, <jim-n@ipsc.com>
Date: 10/10/02 7:11AM
Subject: INTERMOUNTAIN - HP ROTOR OVERSPEED TEST

Please find attached notification Int004 for the Overspeed Test of the HP Rotor.

(See attached file: Int004RotOS.doc)

Would you please let us me know if you wish to attend. Any other queries please let us know.

Regards

Gary

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CC: <kevin.spires@power.alstom.com>, <mick.bailie@power.alstom.com>, <lawrence.watson@power.alstom.com>

IP7008241

Steam Turbine Retrofits for Fossil-fired Plants

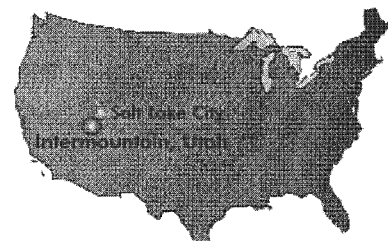


Intermountain, Unit 1, USA

875MW Fossil-fired

**Intermountain Power
Station is located in Delta,
Utah, USA.**

This retrofit project consists of a high pressure pressure (HP) inner module replacement and the provision of technical support during the installation. The aim is to enable IPSC to generate electricity more economically over the remaining life of the plant, utilising ALSTOM Power advanced steam path technology.



ALSTOM

Power
Steam Turbines

IP7008242

Intermountain Units 1 & 2

Technical Overview

In April 2001 ALSTOM Power received the order from the Intermountain Power Service Corporation, Delta, Utah, to retrofit Intermountain Units 1 & 2 with a single flow, high pressure (HP) steam path replacement. This comprises a new rotor with eight stages, fixed and rotating blades, HP casing and HP shaft gland assembly.

Original Unit Commissioning

Unit 1 - 1986

Unit 2 - 1987

Retrofit Commissioning

Unit 2 - April 2002

Unit 1 - April 2003

Fuel Coal

Speed (rpm) 3600

Operation Mode Base load

Original Manufacturer

General Electric

Turbine (OEM) Type 'S2'

No. of HP Stages

Original: 6 + 1 double row
opposed flow nozzle stage
Retrofit: 8

Live Steam Conditions

2400 psig/1000°F/1000°F

Efficiency Improvement

More than 6 percentage point
increase in HP turbine efficiency

Turbine Retrofit Solution

- Project time schedule
12 months for first unit

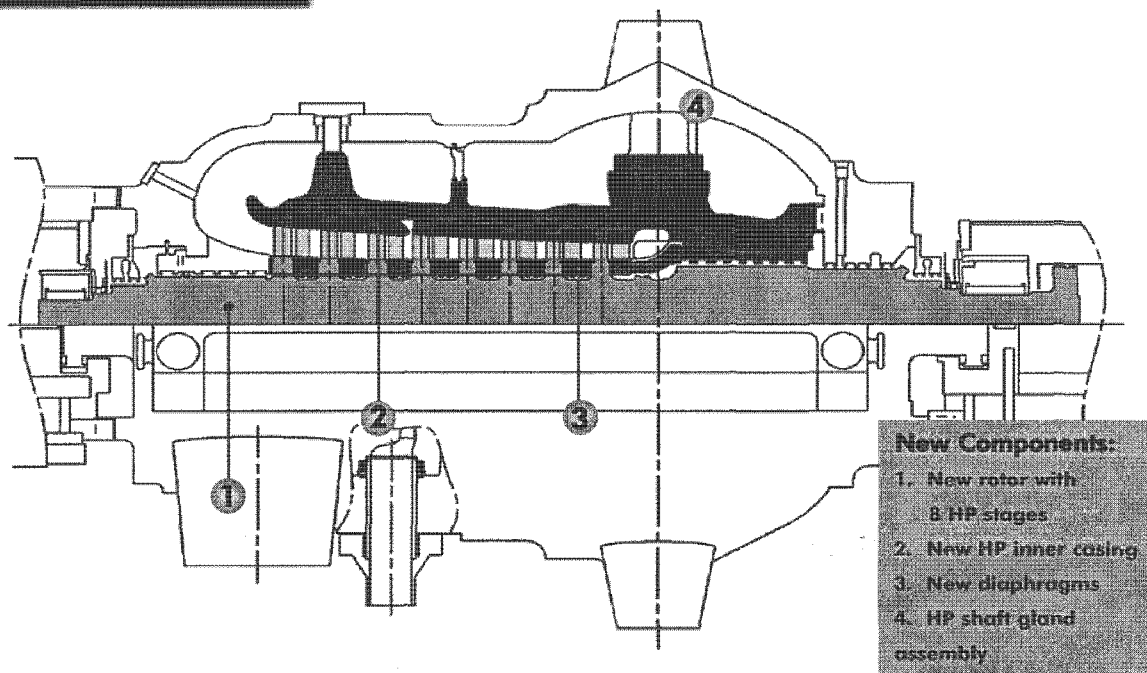
New rotor and HP inner casing
comprise eight HP stages

- Advanced technology rotating blades with integral shrouds and multi-fork pinned roots
- Advanced 3-D fixed blading with integral root and tip platforms
- Improved overall steam path design with smooth outer boundary and exhaust diffuser

Customer Benefits

This HP retrofit strengthens Intermountain Power Service Corporation position in the de-regulated USA power generation market through increased and sustained steam path efficiency, improved reliability and reduced overhaul requirements.

Sectional Arrangement



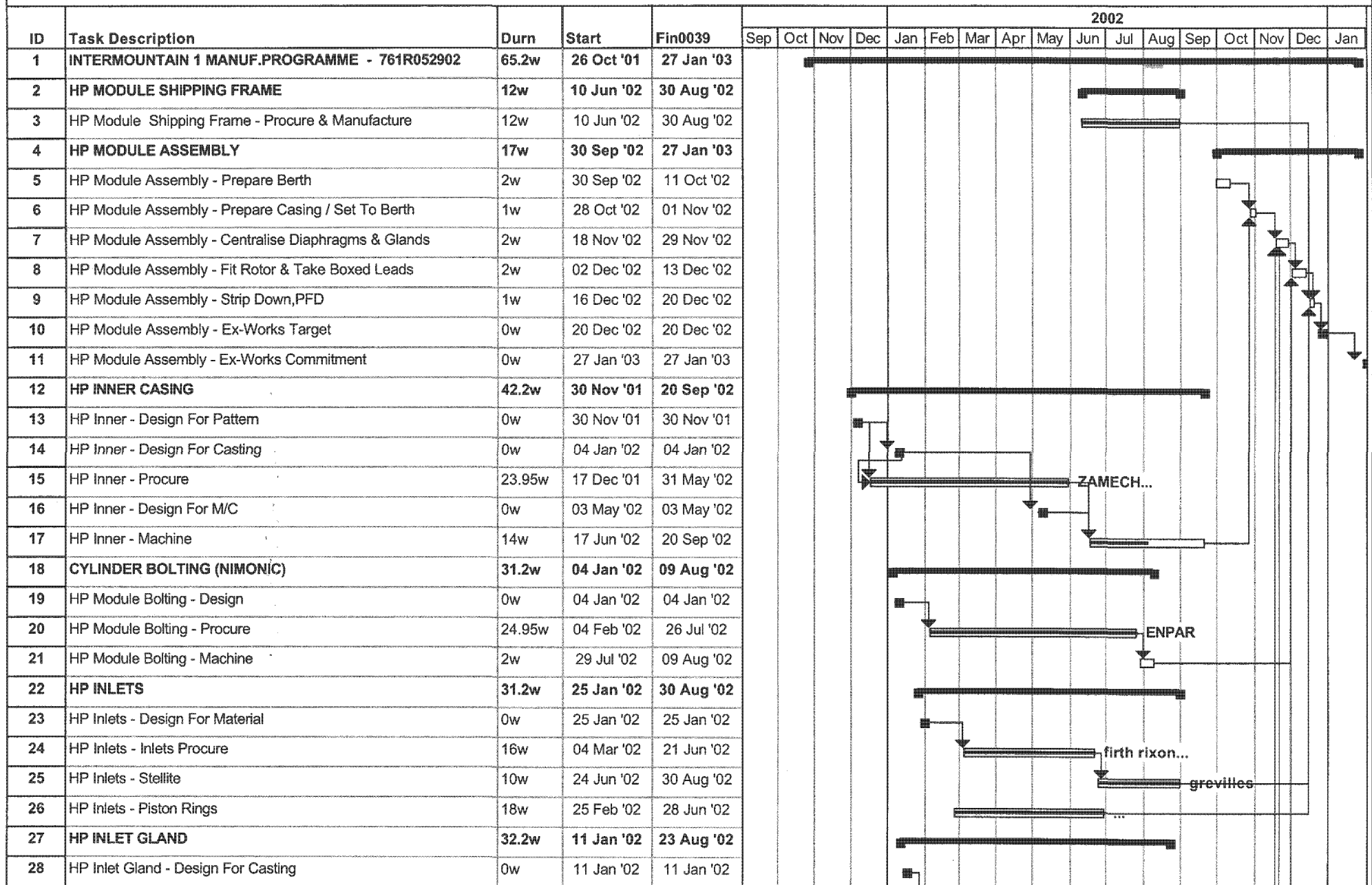
New Components:

1. New rotor with 8 HP stages
2. New HP inner casing
3. New diaphragms
4. HP shaft gland assembly

ALSTOM

ALSTOM (Schweiz) AG - Brown Boveri Strasse 10 - 5401 Baden (Switzerland) - Tel. +41 56 205 8951 Fax. +41 56 205 3179

IP7008243



IP7008244

IP7008245

IP7008246

From: <bill.eisma@power.alstom.com>
To: <jim-n@ipsc.com>
Date: 8/19/02 11:39AM
Subject: Intermountain. Delta 2 Monthly Report

Dear Jim,

Please find attached the monthly report for INTERMOUNTAIN.

We have established a new standardized format - only problem is I don't know what number this would be.

Please let us know if you have any comments

Regards

Bill Eisma

(See attached file: August 2002.doc) (See attached file: Intermountain August 2002.pdf)

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CC: <phong-d@ipsc.com>

IP7008247

From: <bill.eisma@power.alstom.com>
To: <phong-d@ipsc.com>
Date: 10/21/02 7:01AM
Subject: Intermountain. Delta 1 Bladed Rotor

Phong,

Attached are some pictures of the Delta 1 bladed rotor. This completes the third payment milestone for this unit. An invoice will be send via overnight courier and we would appreciate if you would expedite the payment for transfer in November 02.

Thanks,

Bill Eisma

(See attached file: Pa150031A.jpg) (See attached file: Pa150023 A.jpg) (See attached file: Pa150025 A.jpg) (See attached file: Pa150030 A.jpg) (See attached file: Pa150016 A.jpg)

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CC: <jim-n@ipsc.com>

IP7008248

Project: Intermountain Unit 1 & 2
Project Manager: Kevin Spires
Department: STRGP
Progress Report Number:
Issued Date: November 13th 2002
Customer Purchase Order No.: 01 - 45510
ALSTOM Power USA, Inc P.O No.: 1350030
STR Order Number: R0529/01 (Unit 2) & R0529/02 (Unit 1)

Circulation:

STRG Mr. K. Spires
STRGE Mr. R. Cunningham
USA Mr. B. Eisma
IPSC Mr. J. Nelson

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1. SUMMARY OF PROJECT

This is the Progress / Status Report covering the activities regarding the retrofit of the two (2) turbines unit # 1 & 2 in the Intermountain Power Plant. For the retrofit, a new steam path for the HP Turbine will be designed and implemented in both turbines Intermountain unit # 1 & 2 (unit 2 being first). New HP Rotors and Inner Cylinders will be manufactured and installed.

Each turbine retrofit consists of:

- Design and supply of HP rotor with 8 stages of rotating blading,
- Design and supply of fixed blade diaphragms (8 stages in total),
- Design and supply of HP Inner Cylinder,
- Design and supply of balance gland casing and sealing rings (for inlet end),
- Design and supply of stellited inlet liner assemblies (fitted into existing outer casing),
- Design and supply of miscellaneous shims and packing pieces, etc.,
- High speed balancing of the new rotor assembly,
- HP Heater Connection Assembly
- Transportation Cradle for assembled inner cylinder module complete with rotor,
- Technical Support for the installation of the new components,
- Design and supply of special tools or lifting equipment that differ from those required for the existing equipment,
- Supply of Heat Balance Diagrams, etc.
- Witness of post upgrade performance tests,
- Certification, QA documentation, modifications to service manuals, installation & maintenance drawings.

This report covers the period from 1st October 2002 – 31st October 2002

Unit #2: All items delivered, installed and unit back in service

Unit #1: All items on schedule

2. LIST OF DELAYS

COMPONENT

ACTIONS

No Delays

3. ACTUAL STATUS

3.1. Turbine Parts

3.1.1 Engineering for Rotating parts

All Complete

3.1.2 Engineering for Stationary parts

All Complete.

3.1.3 Manufacturing of Rotating parts

Unit 1 HP Rotor blading ongoing
HP Moving Blades – completed

3.1.4. Manufacturing of Stationary parts

Unit 1 components

HP Inner Cylinder – machining in progress due to complete week 45
HP Cylinder Bolting – complete
HP Inlets - complete
HP Inlet Gland - machining completed
Gland Bolting - complete
HP Shaft Gland Rings – complete
HP Diaphragms - manufacture commenced
HP Fixed Blades – manufacture completed
HP Diaphragm Gland Rings –completed

3.2 Any Other Parts

3.2.1 Engineering for any other parts

Completed

3.2.2 Manufacturing of any other parts

None

3.3 Installation

None

3.4 Quality Assurance

Nothing to report.

3.5 Personnel

None

3.6 Upcoming Highlights

Rotor Overspeed and Balance December 3rd. Phong Do from IPSC will attend.

4. ADDITIONAL TOPICS

None

5. LIST OF ATTACHMENTS

Unit 1 Programme with Milestone dates

6. ABBREVIATIONS

AP	ALSTOM Power
HP	High Pressure

Project: Intermountain Unit 1 & 2
Project Manager: Kevin Spires
Department: STRGP
Progress Report Number:
Issued Date: October 23rd 2002
Customer Purchase Order No.: 01 - 45510
ALSTOM Power USA, Inc P.O No.: 1350030
STR Order Number: R0529/01 (Unit 2) & R0529/02 (Unit 1)

Circulation:

STRG	Mr. K. Spires
STRGE	Mr. R. Cunningham
USA	Mr. B. Eisma
IPSC	Mr. J. Nelson

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- Transportation Cradle for assembled inner cylinder module complete with rotor,
- Technical Support for the installation of the new components,
- Design and supply of special tools or lifting equipment that differ from those required for the existing equipment,
- Supply of Heat Balance Diagrams, etc.
- Witness of post upgrade performance tests,
- Certification, QA documentation, modifications to service manuals, installation & maintenance drawings.

This report covers the period from 1st July 2002 – 31st July 2002

Unit #2: All items delivered, installed and unit back in service

Unit #1: All items on schedule

2. LIST OF DELAYS

COMPONENT

ACTIONS

No Delays

3. ACTUAL STATUS

3.1. Turbine Parts

3.1.1 Engineering for Rotating parts

All Complete

3.1.2 Engineering for Stationary parts

All Complete.

3.1.3 Manufacturing of Rotating parts

Unit 1 HP Rotor Blade assembly ongoing and due for completion week 43

HP Moving Blades – completed

3.1.4. Manufacturing of Stationary parts

Unit 1 components

HP Inner Cylinder – machining in progress due to complete week 43

HP Cylinder Bolting – complete

HP Inlets - complete

HP Inlet Gland - machining completed

Gland Bolting - complete

HP Shaft Gland Rings – complete

HP Diaphragms - manufacture commenced

HP Fixed Blades – manufacture ongoing, due to complete last week 37

HP Diaphragm Gland Rings –completed

3.2 Any Other Parts

3.2.1 Engineering for any other parts

Completed

3.2.2 Manufacturing of any other parts

Heater Connection Materials – all available

3.3 Installation

None

3.4 Quality Assurance

Nothing to report.

3.5 Personnel

None

3.6 Upcoming Highlights

Rotor Overspeed and Balance November 20 / 21

4. ADDITIONAL TOPICS

None

5. LIST OF ATTACHMENTS

Unit 1 Programme with Milestone dates

6. ABBREVIATIONS

AP	ALSTOM Power
HP	High Pressure

From: Jim Knapp
To: Phong Do
Date: 12/13/02 3:33PM
Subject: Outage Work on Unit One

Main Turbine Front Standard:

This is the same work that was done during the last outage. All of the instruments associated with turbine EHC and Control Air at the front standard will be replaced.

All parts are on site with the exception of stock #47525 (Trip & Lockout Valve). There are two of these on order, the due date in the computer shows 2/18/03.

HP Turbine upgrade:

The thermocouples for the top and bottom of the HP Shell will need to be specified and ordered. Bill Morgan will take care of this item.

The same thing as the last upgrade on the Main Steam thermocouples and pressure transmitters.

1A Boiler Feed Pump:

The solenoid valves (SV-6, SV-8, SV-12, & SV-13) will be replaced like we did on Unit Two outage. This is part of the reliability upgrade, like the Main Turbine front standard instrument replacement. The parts are on site and committed to Work Order 03-91572-0.

1B Boiler Feed Pump:

The solenoid valves (SV-6, SV-8, SV-12, & SV-13) will be replaced like we did on Unit Two outage. This is part of the reliability upgrade, like the Main Turbine front standard instrument replacement. The parts are on site and committed to Work Order 03-91573-0.

Both of the feed pumps will have the piping and tubing moved away from the inboard bearing to allow better access for all future mechanical work on the bearings.

There are a few miscellaneous problems with bad valves and cracked instrument lines that will also be corrected during the outage. The Injection water pressure control system will be relocated to make it less susceptible to vibration wear and improve the reliability of that system. This was done on Unit 2 Feed Pumps, also.

There has been some talk of installing more Bently Vibration probes on the Main Turbine, but I think that has been canceled for this Outage.

I&C will be installing a new Bently Nevada Vibration system in the back room. This is an obsolescence issue, but will require a large amount of I&C work. This was also done on the Unit Two Outage, and took about 200 hours. It will have to be complete before the end of the outage. This is a Mike Nuttall capital project that took about three full weeks to make it functional and a couple more weeks to finish it up after the outage was over.

There has been some discussion from the Performance Group concerning the Indikon system. I think they are going to try to get that done on both feed pumps this outage. This work will require a new cabinet (or remodeling and existing unused cabinet) in the electrical equipment room east of the main control room. This could turn into a big job, if new cables are required and there is very much setup

needed. Much of this work could be done after the outage, however.

Nothing else I can think of right now. If anything more comes up, I'll let you know. Thank you for your help and support.

Jim Knapp

IP7008260

From: <bill.eisma@power.alstom.com>
To: <jim-n@ipsc.com>
Date: 9/24/02 6:38AM
Subject: IPSC Delta # 1, Monthly Progress Report

James,

Attached is the updated monthly progress report for Delta unit 1.

Regards,

Bill Eisma

(See attached file: September 2002.doc) (See attached file: Intermtn 1 to
End Aug 2002.pdf)

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CC: <phong-d@ipsc.com>

IP7008261

From: Evelyn Warnick/ Thomas Travel <ewarnick01@hotmail.com>
To: Phong Do <PHONG-D@IPSC.com>
Date: 10/21/02 12:08PM
Subject: Itinerary for Phong Do - November 17

IP7008262

From: Kelly Cloward
To: Brad Thompson; George Cross; Mike Alley; Norman Mincer; Ralph Newberry; Richard Houston; Stewart Rowley
Date: 12/3/02 10:41AM
Subject: Mannings USA

I placed req #186342 and 186343 to cover the costs of induction bolt heating services and shell hydraulic closure system for tops-on/tops-off alignment for the HP & IP turbine work. The first req is for the IP section, the second req is for the HP section. The costs need to be separate because the HP work is capital. Please refer to last year's PO #02-19413.
call with questions-
KC

CC: James Nelson; Phong Do

IP7008263

From: <bill.eisma@power.alstom.com>
To: <phong-d@ipsc.com>
Date: 10/21/02 8:41AM
Subject: Milestone Payment Invoice for Delta 1

Phong,

Attached is a copy of the 3 rd. milestone payment invoice for Delta unit 1. The original is in the mail and should be in your accounts department tomorrow 10/22/02. I hope you will process the invoice for payment prior to your trip to the UK to assure the transfer of the amount due per the Contractual agreement period.

Thanks,

Bill Eisma

(See attached file: D1.51483.XLS) (See attached file: DeltaPaymsch.PDF)

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CC: <jim-n@ipsc.com>

IP7008264

From: <kevin.spires@power.alstom.com>
To: "Phong Do" <PHONG-D@ipsc.com>
Date: 10/30/02 3:17AM
Subject: Proposed itinerary

Hi Phong

I have compiled a rough agenda.

Please have a look and comment as appropriate. If you agree in principle I will make arrangements with Hydratight.

As it is only likely to take half a day to visit Hydratight, is there anywhere you would like to visit. They are based close to Birmingham (probably 1 hours drive) and we could call back via Stratford / Warwick or if you let me know somewhere in particular I can work out our route.

Thanks

Kevin

(See attached file: Proposed Itinerary for Phong Do.doc)

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IP7008265

1	2	3	4
A	DRG. No. R200/A0/10325	SHEET No. - OF - SHEETS	PERMISSIBLE VARIATIONS OF UNTOLERANCED MACHINING DIMENSIONS. TOLERANCES ARE NOT TO BE CUMULATIVE
	DIMENSIONS IN INCHES UNLESS OTHERWISE STATED		
	APPLICATION		TOLERANCE
	Bores, slot and recess depths, internal widths, and lengths, external chamfers and radii		+0.010"
B	Shaft diameters, spigot heights, external widths and lengths, internal chamfers and radii		-0.010"
	Centre distances and centres to faces		±0.030"
C			

From: <alan.holmes@power.alstom.com>
To: <phong-d@ipsc.com>
Date: 10/17/02 5:24AM
Subject: Re: Intermountain HP Rotor End Balance

We have checked our measurements (both manual measurements and Faro data) of the unit 1 rotor against the manufacturing drawing for the new rotor and attached are 2 images of the balance weight areas

(See attached file: INT-N1.tif)

(See attached file: INT-N2.tif)

The images show the Faro arm data (showing the rotor pips, rotor profile) from the GE rotor and the geometry of the new rotor to Alstom's rotor machining drawing (R201/A0/3249).

The heavy lines are the rotor machining profile, the chain dotted lines are the rotor forging outline and the other lines are the Faro arm data geometry.

(for scale - the balance weight holes are 3/4" UNC).

These drawings show that the balance weight hole positions for the new rotor are within 0.06" of those on the unit 1 GE rotor that we measured. I have also looked at the new rotor for unit 1, currently in the factory, and the balance weight hole positions are as per the drawing. Since the unit 2 rotor was machined to the same machining data we can be confident that the unit 2 rotor balance planes are in the same position as unit 1 and hence as required by the machining drawing.

Conclusion

We believe that the balance planes on the new Alstom HP rotors are in the same position as the balance planes on the unit 1 GE rotor.

Have you tried to use this balance plane on previous occasions ?

Is there any difference between unit 1 and unit 2 in this area.

When you come to install the unit 1 retrofit in spring 03 I suggest you check the line-up of the N2 balance plane with the access hole prior to removing the top half, to determine if this condition exists with the GE rotor.

The line-up situation could be improved by remachining the threaded access hole in the gland cover with a larger size deliberately angled relative to the existing hole to improve the line up.

Regards
Alan

"Phong Do" <PHONG-D@ipsc.com> on 16/10/2002 20:51:12

To: Alan HOLMES/GBRUG01/Power/ALSTOM@GA, Kevin
SPIRES/GBRUG01/Power/ALSTOM@GA

IP7008267

cc: "James Nelson" <JIM-N@ipsc.com>, Bill Eisma/USRIC02/Power/ALSTOM@GA

Subject: HP Rotor End Balance

Dear Alan/Kevin,

One of the Unit 2 HP retrofit startup major concerns was the offset between the rotor-N2-End Balance Hole Center and the N2 Casing Access Hole Centers. The center lines of the N2 casing holes were about 1/2" to 3/4" off (lower) relative to the N2 rotor hole's center lines. The N1 center lines were lined up good.

After some failures, our performance group finally created some flexible tools and was able to install the end balance weights. This process took a significant bite out of the startup time.

Please provide recommendations to correct the above concern.

Thanks.

Phong Do
Day Phone: (435)864-6475
Fax: (435)864-0775
Email: Phong-D@IPSC.Com

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CC: <kevin.spires@power.alstom.com>, <jim-n@ipsc.com>,
<bill.eisma@power.alstom.com>

IP7008268

From: <alan.holmes@power.alstom.com>
To: "Phong Do" <PHONG-D@ipsc.com>
Date: 12/13/02 8:27AM
Subject: Re: Low Speed Balance Recommendation

My approach to low speed balancing would be:

1 If a shaft line is running with acceptable levels of vibration, do nothing. Slow speed balancing simply because the rotor is out and it seems like a good idea, usually is not.

2 Never, never, never remove the factory fitted (high speed balance) weights as a matter of course. I cannot understand why anyone would even think of doing this, but my experience in North America indicates that it is almost standard practice. It completely negates the original high speed balance. (This is not likely to have been a major factor in your IP rotor problem because the rotor was bent and had a large out of balance that would swamp the factory high speed balance).

3 Remove any weights that have been fitted for in-situ balance correction. They may be correcting an out of balance on an adjacent rotor. ie if you ever slow speed balance the new HP rotor fitted to unit 2, remove the weights added to the front end to correct the balance problem due to the IP, before balancing.

4 Review the condition of the rotor (straightness) and any work carried out eg re-blading and make a judgement as to where any balance error might be occurring. Add or remove weights in planes close to the likely source of the out of balance.

As I remember from conversations with Barry Ingle, the IP rotor had a significant bend and the front coupling OD and face were trued up because they were running out of true. However you did not true up the coupling OD and face at the rear of the rotor which were likely to be running out by the same amount because the rotor bend was in the centre. In my opinion, not trueing up the rear coupling is likely to be a major contributor to your balance problem. The IP rotor was slow speed balanced running on its journals. When the rear of the IP rotor is coupled to the LP rotor, the rabet fit ensures that the IP coupling runs true to the LP coupling which means that the journals are not running true to each other because there is a known runout between the IP rear journal and coupling. Rugby rules require concentricity better than 0.0008" TIR journal/journal but allow 0.0012" TIR maximum coupling/coupling because it is recognised that journal/journal is most important for balance (the individual rotors are balanced supported on their journals not on their couplings). The face error on the IP rear coupling will cause the IP rotor to bend slightly when it is bolted to the LP rotor so it is running in a different bend (and balance) condition to when it was slow speed balanced. This is why we require coupling face errors to be less than 0.0005" TIR on ex service rotors (less than 0.00025" TIR on new rotors).

Hope this helps

Regards

Alan

IP7008269

"Phong Do" <PHONG-D@ipsc.com> on 10/12/2002 16:06:57

To: Alan HOLMES/GBRUG01/Power/ALSTOM@GA, Kevin
SPIRES/GBRUG01/Power/ALSTOM@GA

cc:

Subject: Low Speed Balance Recommendation

Alan,

Please provide guideline/recommendation regarding turbine rotor low speed balance.

On the last U2 outage, we did focused on the midplane for the rotor excessive runout during the low speed balance.

Your quick response will be greatly appreciated so that the recommendation to our manager would be issued soon. Thank you for all of your wonderful support.

Phong Do

Day Phone: (435)864-6475

Fax: (435)864-0775

Email: Phong-D@IPSC.Com

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CC: <roger.beaumont@power.alstom.com>,
<kevin.spires@power.alstom.com>

IP7008270

From: <robert.cunningham@power.alstom.com>
To: "Phong Do" <PHONG-D@ipsc.com>
Date: 1/23/03 1:46AM
Subject: Re: Shell Thermo Couple

Hello Phong

To my knowledge, the only additional instrumentation devices that we asked for were on the outer upper shell at the inlet branch.

The attached drawing shows the position and mounting machining details.

(See attached file: R200_A0_10325_C_EN_001.tif)

Can you please provide more details on the outer shell thermocouples that you are describing. (Who asked for them, etc)

Myself and Adrain will give you a ring at about 4.00 UK time (9.00 Utah time).

Speak to you later.

Rob C

"Phong Do" <PHONG-D@ipsc.com> on 22/01/2003 18:43:33

To: Robert CUNNINGHAM/GBRUG01/Power/ALSTOM@GA
cc: "Bill Morgan" <BILL-M@ipsc.com>, "Jim Knapp" <JIM-KNAPP@ipsc.com>,
"James Nelson" <JIM-N@ipsc.com>, "John Fritzges" <JOHN-F@ipsc.com>,
Alan HOLMES/GBRUG01/Power/ALSTOM@GA, Kevin
SPIRES/GBRUG01/Power/ALSTOM@GA, Wally
FALCONER/GBRUG01/Power/ALSTOM@GA

Subject: Shell Thermo Couple

Dear Rob,
Please provide info & drawing regarding the HP outer shell thermocouple installation.

Last year we install two temporary thermocouples on the HP outer shell, 1 on the upper half and other on the lower half, about 1/3 of the shell length relative to the front end. The thermocouples provide critical startup shell temperatures to ensure an acceptable thermal growth of the shell. Due to the short notice, we welded the two thermal pads (about 1" square) on the shell. This installation method may not provide a most accurate info.

I understand that Alstom has a better method of installing the shell thermocouple, ie, drill, tap the shell and install the thermocouple

IP7008271

about 1/2 of the shell thickness...

Rob, please provide recommendations and drawings.

Thanks.

CC: <alan.holmes@power.alstom.com>, <kevin.spires@power.alstom.com>,
<wally.falconer@power.alstom.com>, <adrian.bramley@power.alstom.com>,
<RUGWW.TEGMail@test.alstom.com>

From: "sgbrown" <mb7238k@server-mail.com>
To: "Phong Do" <PHONG-D@ipsc.com>
Date: 12/10/02 4:44PM
Subject: Re: Turbine Horizontal Joint Hydraulic Bolting

Hi Phong,

Please see the attached as requested.

Best regards,
Steve Brown

>Steve,
>Please send me, ASAP, the user list pertaining hydraulic bolting for
>power plants.
>
>I appreciated your time and info. Our staff is interesting in learning
>more about the technology. Thanks.
>
>

CC: <chris.howell@technofast.com>

IP7008273

From: <robert.cunningham@power.alstom.com>
To: "Phong Do" <PHONG-D@ipsc.com>
Date: 10/18/02 1:26AM
Subject: Re: Update drawing - Intermountain HP Rotor

Hello Phong

Please find below an extract from the Intermountain HP Rotor drawing.
(Embedded image moved to file: pic07129.pcx)

The number of holes for the stub shaft have been increased from 8 to 12.

Regards

Rob C

"Phong Do" <PHONG-D@ipsc.com> on 17/10/2002 19:45:10

To: Robert CUNNINGHAM/GBRUG01/Power/ALSTOM@GA
cc:

Subject: Update drawing

Rob,

In reviewing the HP rotor balancing matter, I learned that the drawing R201/A0/3249, HP Rotor Machining needs to be updated to reflex the new HP Front End drill and tap hole corrections (number of holes, dimensions...) to match with our GE existing coupling. This applies for both units. Please send an updated drawings.

Thanks.
PTD

CC: <alan.holmes@power.alstom.com>, <RUGWW.TEGMail@test.alstom.com>, <kevin.spires@power.alstom.com>

IP7008274

Project: Intermountain Unit 1 & 2
Project Manager: Kevin Spires
Department: STRGP
Progress Report Number:
Issued Date: September 23rd 2002
Customer Purchase Order No.: 01 - 45510
ALSTOM Power USA, Inc P.O No.: 1350030
STR Order Number: R0529/01 (Unit 2) & R0529/02 (Unit 1)

Circulation:

STRG	Mr. K. Spires
STRGE	Mr. R. Cunningham
USA	Mr. B. Eisma
IPSC	Mr. J. Nelson

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1. SUMMARY OF PROJECT

This is the Progress / Status Report covering the activities regarding the retrofit of the two (2) turbines unit # 1 & 2 in the Intermountain Power Plant. For the retrofit, a new steam path for the HP Turbine will be designed and implemented in both turbines Intermountain unit # 1 & 2 (unit 2 being first). New HP Rotors and Inner Cylinders will be manufactured and installed.

Each turbine retrofit consists of:

- Design and supply of HP rotor with 8 stages of rotating blading,
- Design and supply of fixed blade diaphragms (8 stages in total),
- Design and supply of HP Inner Cylinder,
- Design and supply of balance gland casing and sealing rings (for inlet end),
- Design and supply of stellite inlet liner assemblies (fitted into existing outer casing),
- Design and supply of miscellaneous shims and packing pieces, etc.,
- High speed balancing of the new rotor assembly,
- HP Heater Connection Assembly
- Transportation Cradle for assembled inner cylinder module complete with rotor,
- Technical Support for the installation of the new components,
- Design and supply of special tools or lifting equipment that differ from those required for the existing equipment,
- Supply of Heat Balance Diagrams, etc.
- Witness of post upgrade performance tests,
- Certification, QA documentation, modifications to service manuals, installation & maintenance drawings.

This report covers the period from 1st July 2002 – 31st July 2002

Unit #2: All items delivered, installed and unit back in service

Unit #1: All items on schedule

2. LIST OF DELAYS

COMPONENT

ACTIONS

No Delays

3. ACTUAL STATUS

3.1.Turbine Parts

3.1.1 Engineering for Rotating parts

All Complete

3.1.2 Engineering for Stationary parts

All Complete.

3.1.3 Manufacturing of Rotating parts

Unit 1 HP Rotor is finish machined and ready for blade assembly which is due to commence in week 37.

HP Moving Blades – due to be completed week 37

3.1.4. Manufacturing of Stationary parts

Unit 1 components

HP Inner Cylinder – machining in progress due to complete week 38

HP Cylinder Bolting – machining due to be completed week 32

HP Inlets - complete

HP Inlet Gland - machining completed

Gland Bolting - complete

HP Shaft Gland Rings – complete

HP Diaphragms – material available, due to commence first week 36

HP Fixed Blades – manufacture ongoing, due to complete last week 36

HP Diaphragm Gland Rings –completed

3.2 Any Other Parts

3.2.1 Engineering for any other parts

Completed

3.2.2 Manufacturing of any other parts

Heater Connection Materials – all available

3.3 Installation

None

3.4 Quality Assurance

Nothing to report.

3.5 Personnel

None

3.6 Upcoming Highlights

None.

4. ADDITIONAL TOPICS

None

5. LIST OF ATTACHMENTS

Unit 1 Programme with Milestone dates

6. ABBREVIATIONS

AP	ALSTOM Power
HP	High Pressure

Summary of U2 Acceptance Tests

VWO

	Acceptance Tests		Confirmation Tests		Average	Gaurantee	Pre-Upgrade Uncertainty
	Test 7	Test 8	Test 9	Test 10			
HP Turbine Efficiency (%)	92.85	92.83	92.72	92.80	92.80	92.20	83.48 ± 0.346%
HP Wheel Power (MW)	302.8	304.5	300.4	304.4	303.01	299.0	259.4 ± 2.508%
Throttle Flow (PPH)	7,079,377	7,084,189	7,063,494	7,069,808	7,074,217	6,900,000	6,412,292 ± 2.510%
IP Turbine Efficiency (%)							
Net Turbine Cycle Heat Rate (Btu/kwh)	7,701	7,636	7,671	7,676	7,671	7,683	7,807 ± 2.554%

IP7008280

From: <kevin.spires@power.alstom.com>
To: "Phong Do" <PHONG-D@ipsc.com>
Date: 1/20/03 5:23PM
Subject: Project data sheet

Phong

Please have a look at this first draft.

Thanks

Kevin

(See attached file: Intermountain.pdf)

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IP7008281

Proposed Itinerary for Phong Do, IPSC, Visit to Rugby 19-22 Nov 2002

19th November

Arrive BHX & Transfer to Ashlawn House

PM Visit to factory for a quick tour of Intermountain components

Meal at Ashlawn

20th November

Proposed visit to Hydratight Sweeney

Meal at local restaurant

21st November

Discussions on Intermountain Unit 2 performance

Discussions on Unit 1

Meal at local restaurant

22nd November

AOB

Witness Overspeed of Unit 1 rotor

Meal at local resaurant

23rd November

Fly back to USA

From: <kevin.spires@power.alstom.com>
To: "Phong Do" <PHONG-D@ipsc.com>
Date: 12/11/02 5:01AM
Subject: Re: Intermountain U1 Over Speed Result

Hi Phong

Thanks for your email.

Here is Nigel's reply which confirms we are right.

Hope this answers your query.

Regards

Kevin

----- Forwarded by Kevin SPIRES/GBRUG01/Power/ALSTOM on
11/12/2002 11:57 -----

Nigel ARMSTRONG
11/12/2002 11:51

To: Kevin SPIRES/GBRUG01/Power/ALSTOM@GA
cc: Dave MURPHY/GBRUG01/Power/ALSTOM@GA, Bob
MITCHELL-KING/GBRUG01/Power/ALSTOM@GA

Subject: Re: Intermountain U1 Over Speed Result (Document link: Kevin
SPIRES)

Kevin,

I will confirm the numbers are correct and extremely good ,
they are not however unusual for this type of shaft as manufactured and
balanced here.

In inches we are allowed according to Rugby Specification 601/0020 at 3600
RPM 0.00032" Pk/ Pk (Vertical Pedestal movement) we are allowed
double that at any other speed.

For this rotor the Pk/Pk readings are as follows.

Speed

RPM	Ped 1	Ped 2
1850	0.0000208"	0.0000196"
3600	0.0000116"	0.0000412"
3960	0.0000996"	0.00008"
4170	0.0002036"	0.000048"
4320	0.0000716"	0.000148"
	HP Rear	HP Front

If any doubts remain I would suggest that station can talk to two of our
previous retrofit customers:-

1) Miller because when the first unit ran station staff had to double check
their instrumentation to see if it was actually working .

2)Spruce, because they would not have believed the overspeed vibration
numbers if they had not witnessed the whole process themselves and had it
reconfirmed when the machine was installed and first run at site.

IP7008283

I would say the secret of low vibration at site is in the alignment, accuracy of any compensation offsets within the alignment and the actual condition of the adjoining shafts.

regards
Nigel

"Phong Do" <PHONG-D@ipsc.com> on 10/12/2002 17:31:17

To: Kevin SPIRES/GBRUG01/Power/ALSTOM@GA
cc:

Subject: U1 Over Speed Result

Kevin,
Would you please talk to N. Armstrong to clarify the vertical displacement unit of the U1 HP rotor high speed balance result. The graph indicates that the unit is in micro meter. From the graph, the maximum peak-to-peak vibration is about 6 micro meter, or about 0.0002". This is extremely toooooo small. Please verify the unit and give me the result in (1/1000)". Thank you.

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CC: <bill.eisma@power.alstom.com>

IP7008284

INTERMOUNTAIN UNITS 1 & 2HP TURBINE RETROFITHP TURBINE SWALLOWING CAPACITYUNIT 2

Performance Tests were carried out on Unit 2 by PGT in April 2002.

The installed ASME primary flow section, located downstream of the highest pressure feedwater heaters, was acid cleaned during the retrofit outage. On inspection, the internal surface was found to be "scarred and rough". In accordance with ASME guidelines, a value of $\pm 2.5\%$ was selected by PGT as the base uncertainty of the feedwater flow nozzles.

The corrected throttle flow (derived test flow corrected to design pressure and temperature) was determined to be as follows:

	<u>Test 7</u>	<u>Test 8</u>
PGT instrumentation	7,073,880 lb/h	7,077,720 lb/h
Station Instrumentation	6,931,726 lb/h	6,938,958 lb/h

This compared to the requirement of the throttle flow to be in the range 6,900,000 lb/h and 6,975,000 lb/h.

However, ALSTOM were surprised at this apparent high figure (although the $\pm 2.5\%$ uncertainty was noted), and in addition IPSC indicated that they were having to throttle more than they expected at a current (maximum) nominal load of 900 MW. IPSC estimated that the heat rate at 900 MW was approximately 0.1% worse than expected.

In order to better estimate the likely throttle flow (ie trying to reduce the uncertainty surrounding the feedwater flow measurement), ALSTOM carried out a calculation starting from the nominal heat balance diagram TS29247 at 6,900,000 lb/h throttle flow.

Using this as base, the effect of all the measured test conditions was determined - these included:

- Throttle pressure and temperature
- Reheat temperature
- Condenser pressures
- HP feedwater heater inlet and outlet temperatures
- Steam flow to IP rotor cooling,
- Steam flow to feedwater pump turbines.
- Superheater spraywater flow

From this heat balance calculation, the following comparison is made:

INTERMOUNTAIN UNIT 2

		TS29247	TS29247 Corrected to Test conditions		TEST 8 APRIL 2002 PGT Test Measured	Station Instrumentation.
Throttle pressure	psia	2412.2	2389.8	←	2389.8	2398
Throttle temperature	°F	1000.0	993.2	←	993.2	997.5
Throttle flow	lb/h	6,900,000	6,849,904		7,039,852	6,904,554
Steam flow to IP rotor cooling	lb/h	17,115	18,987	←	18,987	
HP exhaust pressure	psia	629.0	630.9		628.2	624.5
IPSV pressure	psia	585.5	587.3		582.3	582.4
IPSV temperature	°F	1000.0	1006.7	←	1006.7	1007.5
IP exhaust pressure	psia	138.8	137.2		137.1	
Flow to FPT's (Total)	lb/h	276,367	282,021	←	282,021	
Condenser A pressure	"Hg	2.99	3.56	←	3.56	3.62
Condenser B pressure	"Hg	2.24	2.80	←	2.80	2.81
Condenser C pressure	"Hg	1.66	2.55	←	2.55	2.44
Condenser hotwell Temperature	°F	114.9	121.2		121.1	
DC outlet temperature	°F	123.5	128.7		128.5	
Heater 1 outlet temperature	°F	162.7	163.5			164.3
Heater 2 outlet temperature	°F	200.6	201.0			204.0
Heater 3 outlet temperature	°F	270.2	270.3			270.7
Heater 4 outlet temperature	°F	303.1	303.1			302.6
Deaerator outlet temperature	°F	350.3	350.3			348.7
Heater 6 inlet temperature	°F		355.7			355.3
Heater 6 outlet temperature	°F	404.0	403.8	←	403.8	
Heater 6 drain temperature	°F		364.9	←		364.9
Heater 7 outlet temperature	°F	488.6	487.6	←	487.6	
Heater 7 drain temperature	°F		412.5	←	412.5	
Heater 8 outlet temperature	°F	552.4	550.9	←	550.9	
Heater 8 drain temperature	°F		497.4	←	497.4	
Superheater spraywater flow	lb/h	0	108288	←	108288	66860
Reheater spraywater flow	lb/h	0	0	←	0	10527
Make up	%	1.0	0.0	←	0.0	
Generator output	MW	973186	969660		981954	982200
Heat rate	Btu/kWh	7683	7707		7886	7750

Note: ← = specified data in heat balance calculation. All other data is as-calculated.

ABXA

From the tabulated data, it can be seen that the calculated throttle flow was 6,849,904 lb/h, but the generator output was only 969,660 kW compared to the test measurement of 981,954 kW. Additional throttle flow must therefore be present to generate this increased power.

Thus the additional throttle flow factor required to generate 981,954 kW is $981,954 / 969,660 = 1.0127$.

This gives a required throttle flow of $1.0127 \times 6,849,904 = 6,936,898$ lb/h.

The actual test was conducted at main steam conditions different to nominal design, therefore a correction factor is required to derive what the throttle flow would have been with design main steam conditions:

$$\text{Flow correction factor} = \frac{2412.2 \times \sqrt{(993.2 + 460)}}{2389.8 \sqrt{(1000 + 460)}} = 1.0070$$

Hence the **estimated** throttle flow for Intermountain Unit 2 at VWO under design main steam conditions is $6,936,898 \times 1.0070 = \mathbf{6,985,456}$ lb/h.

This compares with the PGT corrected flow of 7,077,720 lb/h (ie estimated corrected flow is 1.3% lower than the PGT corrected flow derived from the flowmeter with a nominal uncertainty of $\pm 2.5\%$)

UNIT 1 PROPOSAL

Unit 1 fixed blades are about to be manufactured.

In discussions with IPSC it has been mutually understood that, as the units are limited for the foreseeable future to a maximum load around 900 - 950 MW (including some throttling reserve for rapid load pickup capability), it is desirable for Unit 1 capacity to be reduced compared to that of the installed Unit 2.

This reduction is agreed to be nominally 1% of throttle flow, and will be achieved by modifying the fixed blade throat openings of stage 1 only.

However, to maintain the final feedwater temperature, the fixed blade following the HP steam path extraction has also to be modified. Without this additional modification, the final feedwater temperature would reduce by approximately 1°F.

With these changes to HP stage 1 and 6 fixed blades, the expected throttle flow of Unit 1 (assuming similar as-made nozzle sizes to Unit 2) would be $6,985,456 \times 0.99 = 6,915,600$ lb/h.

This itinerary was sent to you courtesy of Worldspan's My Trip And More.
Click on the link below to display the itinerary.

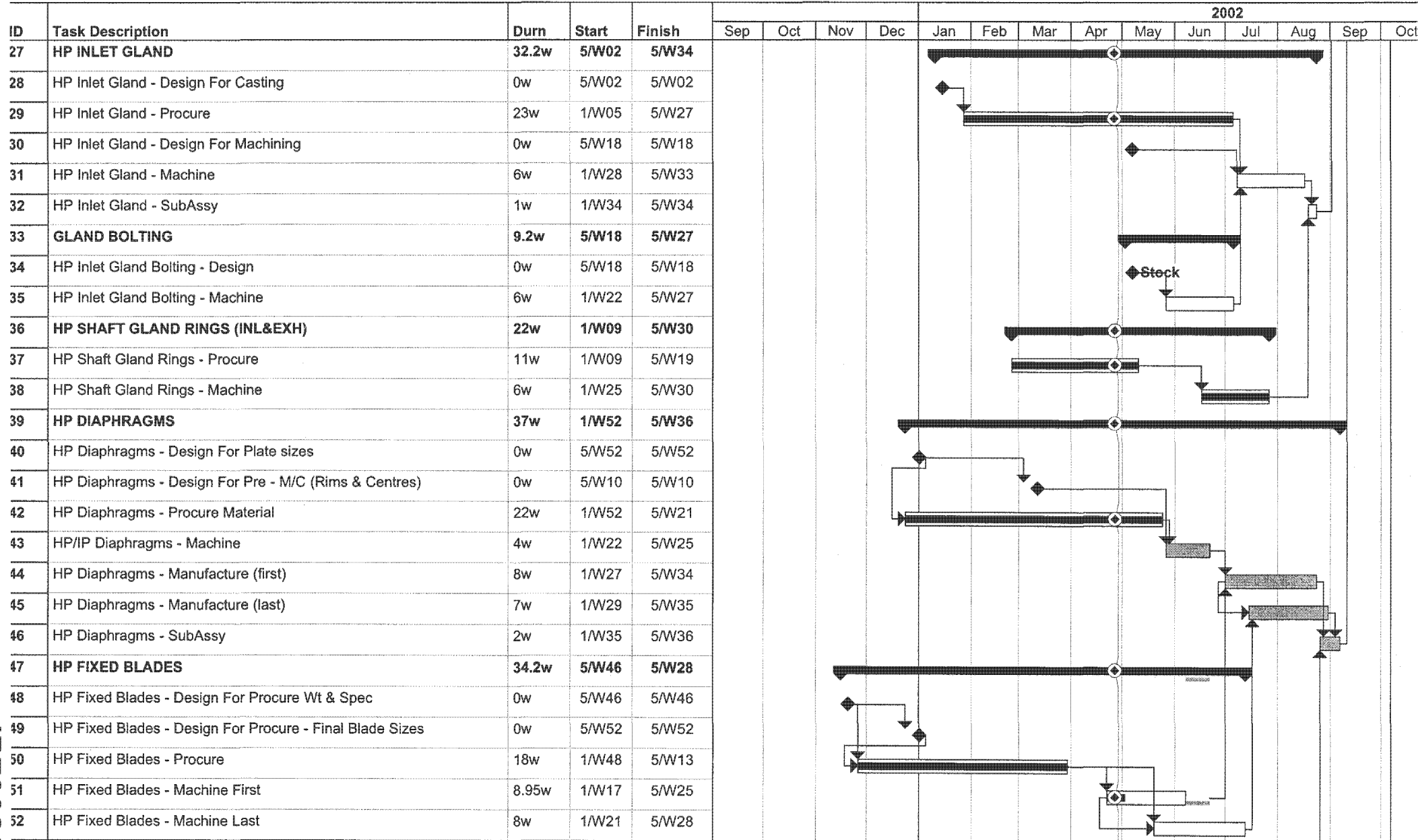
Comments from Evelyn Warnick/ Thomas Travel

[Click here to view itinerary](#)

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LN=Do&RL=L38Y97&DT=browser&VW=detail&LA=EN&PR=MTAM&TF=12](https://mytripandmore.com/IVWMain.asp?LN=Do&RL=L38Y97&DT=browser&VW=detail&LA=EN&PR=MTAM&TF=12)

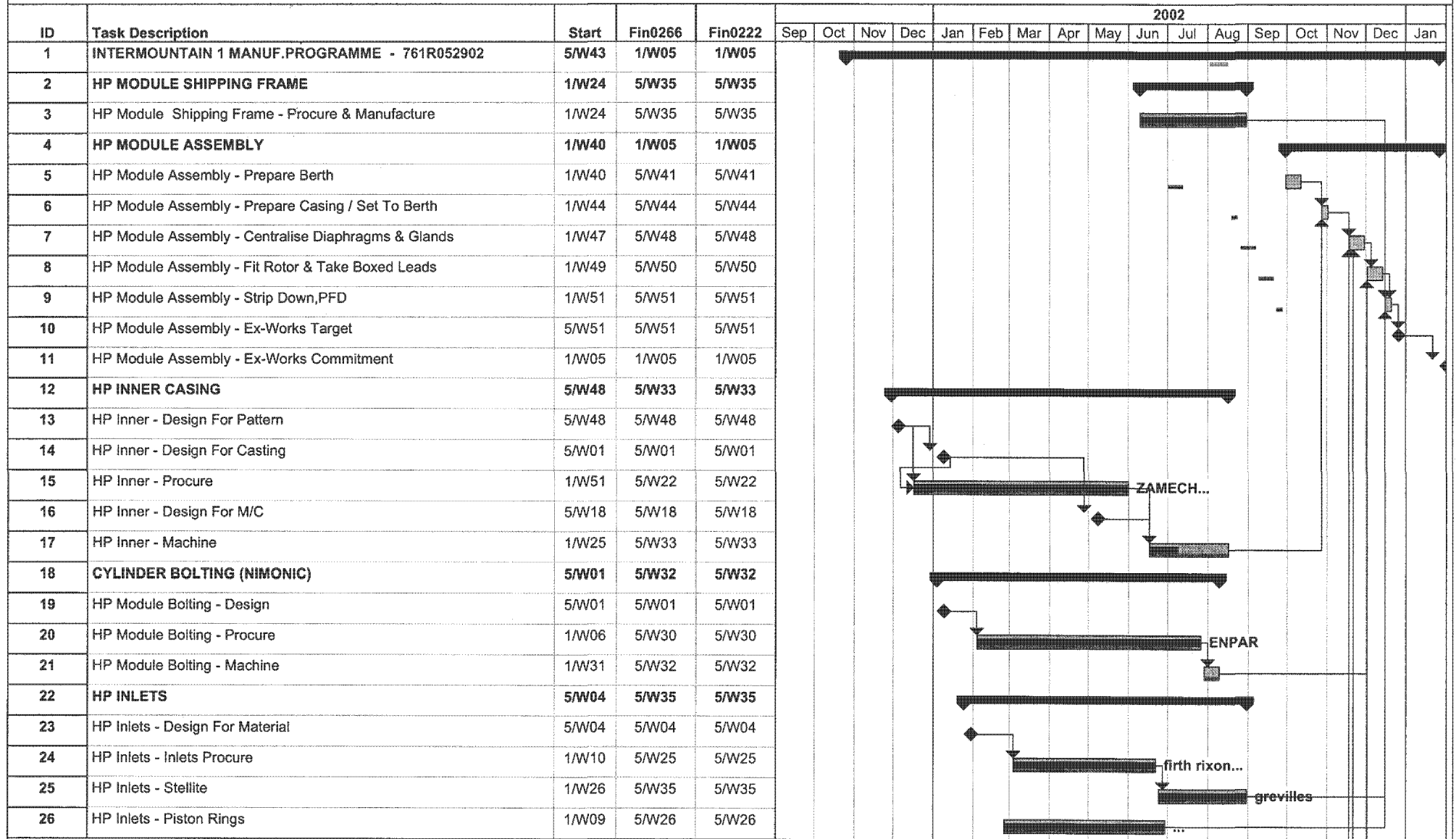
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INTERMOUNTAIN UNIT 1 MANUFACTURING PROGRAMME

0130



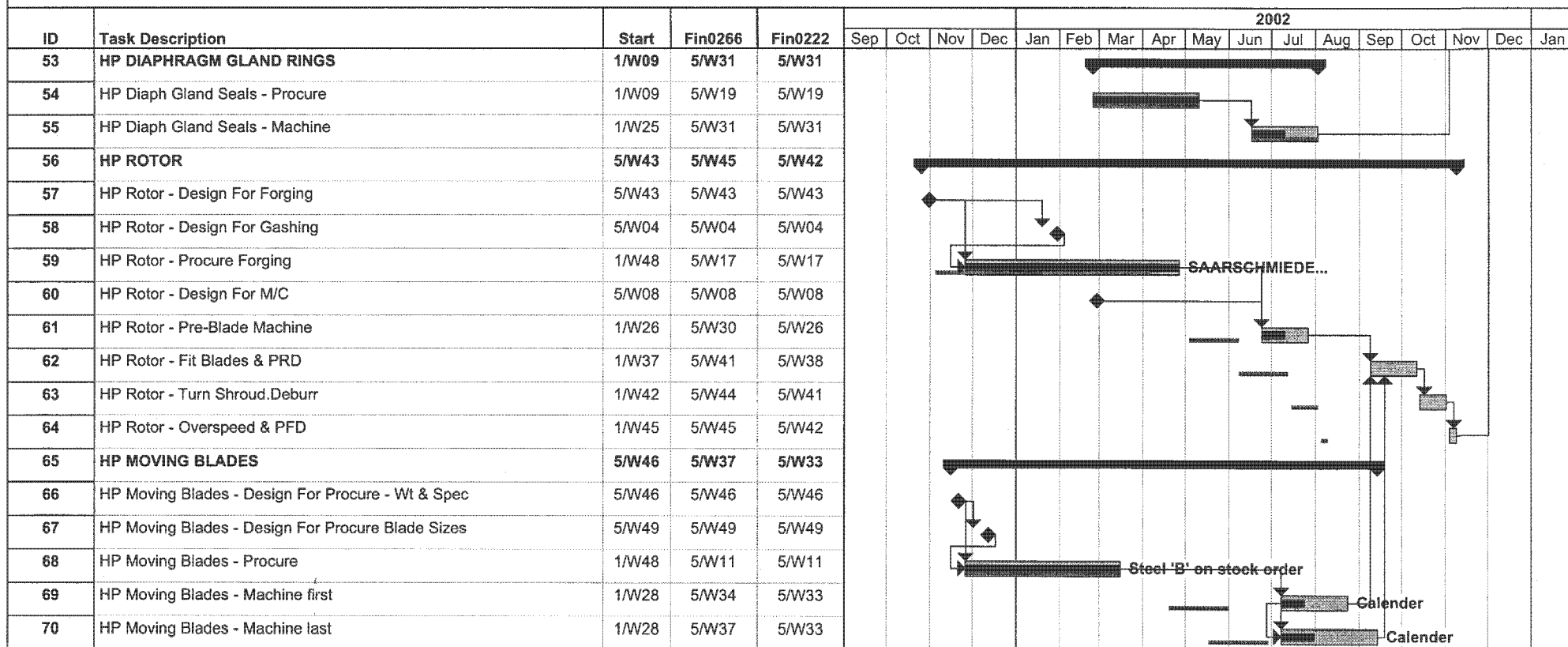
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INTERMOUNTAIN UNIT 1 MANUFACTURING PROGRAMME

0130



ID	Task Description	Durn	Start	Finish	2002												2003												2004																							
					S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J													
1	INTERMOUNTAIN 1 MANUF.PROGRAMME - 761R052902	65.2w	5/W43	1/W05																																																
2	HP MODULE SHIPPING FRAME	12w	1/W24	5/W35																																																
3	HP Module Shipping Frame - Procure & Manufacture	12w	1/W24	5/W35																																																
4	HP MODULE ASSEMBLY	17w	1/W40	1/W05																																																
5	HP Module Assembly - Prepare Berth	2w	1/W40	5/W41																																																
6	HP Module Assembly - Prepare Casing / Set To Berth	1w	1/W44	5/W44																																																
7	HP Module Assembly - Centralise Diaphragms & Glands	2w	1/W47	5/W48																																																
8	HP Module Assembly - Fit Rotor & Take Boxed Leads	2w	1/W49	5/W50																																																
9	HP Module Assembly - Strip Down,PFD	1w	1/W51	5/W51																																																
10	HP Module Assembly - Ex-Works Target	0w	5/W51	5/W51																																																
11	HP Module Assembly - Ex-Works Commitment	0w	1/W05	1/W05																																																
12	HP INNER CASING	37.2w	5/W48	5/W33																																																
13	HP Inner - Design For Pattern	0w	5/W48	5/W48																																																
14	HP Inner - Design For Casting	0w	5/W01	5/W01																																																
15	HP Inner - Procure	23.95w	1/W51	5/W22																																																
16	HP Inner - Design For M/C	0w	5/W18	5/W18																																																
17	HP Inner - Machine	9w	1/W25	5/W33																																																
18	CYLINDER BOLTING (NIMONIC)	31.2w	5/W01	5/W32																																																
19	HP Module Bolting - Design	0w	5/W01	5/W01																																																
20	HP Module Bolting - Procure	24.95w	1/W06	5/W30																																																
21	HP Module Bolting - Machine	2w	1/W31	5/W32																																																
22	HP INLETS	31.2w	5/W04	5/W35																																																
23	HP Inlets - Design For Material	0w	5/W04	5/W04																																																
24	HP Inlets - Inlets Procure	16w	1/W10	5/W25																																																
25	HP Inlets - Stellite	10w	1/W26	5/W35																																																
26	HP Inlets - Piston Rings	18w	1/W09	5/W26																																																
27	HP INLET GLAND	32.2w	5/W02	5/W34																																																

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From: <wally.falconer@power.alstom.com>
To: "Phong Do" <PHONG-D@ipsc.com>
Date: 4/9/03 2:07AM
Subject: Intermountain Unit 1 HP replant - checklist (1)

Hello Phong

As promised I am forwarding a copy of the checklist in unapproved form. The formal copy will arrive in due course. Because the file sizes are quite large I am sending it in two separate emails. (Sections 2,6,7,8 & index)

(See attached file: 6HP-RBUS.pdf) (See attached file: CL_INDEX.pdf)

Hope you are enjoying getting to know your family again ! I know I am.

Best regards, Wally

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IP7008298



CUSTOMER SERVICE
TECHNICAL SERVICE SECTION

CHECKLIST REFERENCE NO.

1175

CONTRACT: INTERMOUNTAIN

UNIT NUMBER: 1

ST NUMBER: 11246

COMPLETED COPY

SECTIONS 1 - 9

THE ENCLOSED DOCUMENTS FORM A RECORD OF MEASUREMENTS TAKEN
DURING STRIPDOWN / REBUILD OF THE MACHINE IDENTIFIED ABOVE

IP7008299



CUSTOMER SERVICE
TECHNICAL SERVICE SECTION

CHECKLIST REFERENCE NO.

1175

CONTRACT: INTERMOUNTAIN

UNIT NUMBER: 1

ST NUMBER: 11246

Signed: _____ for Stripdown

Signed: _____ for Rebuild

THE ENCLOSED DOCUMENTS FORM A RECORD OF MEASUREMENTS TAKEN
DURING STRIPDOWN / REBUILD OF THE MACHINE IDENTIFIED ABOVE

IP7008300



CUSTOMER SERVICE
TECHNICAL SERVICE SECTION

CHECKLIST SECTION INDEX

Checklist No. 1175

<u>SECTION</u>	<u>TITLE</u>
1	QUALITY PLAN
	TURBINE STRIPDOWN
2	HP CYLINDER
3	COUPLINGS AND PEDESTALS
4	Not used
	TURBINE REBUILD
5	HP CYLINDER WORKS BUILD
6	HP CYLINDER SITE BUILD
7	HP CYLINDER MACHINING DATA
8	COUPLINGS
9	BEARINGS AND PEDESTALS

FIELD QUALITY PLAN PAGE 1 of 1

PLAN TYPE: OVERHAUL

CONTRACT PLAN No: IM/01/001

PREPARED BY: W.H. FALCONER

CONTRACT NAME: INTERMOUNTAIN

ISSUE DATE : FEBRUARY 2003

TITLE: 2003 HP REPLANT

UNIT No: 1

REVISION: A FEBRUARY 2003

APPROVAL REFERENCE

A = Approval required

C = Copy of document required

E = Examine cert./document

ABBREVIATIONS :-

H = Hold point

I = In-process check

N = Notify readiness for test

R = Review required

S = Surveillance

X = Originator of Inspn/document

NOTE : Prior to commencement of any section of the following Field Quality Plan, reference documents and acceptance standards, identified in columns 6 & 7, must be verified as the current issues.

NO.	COMPONENT/ACTIVITY	REQUIREMENT	TYPE OF CHECK	QUANTITY OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE STANDARD	RECORD FORMAT	AGENCY				REMARKS	DWG REV
								SUB	ALST	CUST			
1	TURBINE CHECKLIST (STRIPDOWN AND REBUILD)	CLEARANCE CHECKS	MEASUREMENT	100%	N/A	MACHINE DRAWINGS	CHECKLIST REF No. 1175		X I S A	C		SECTIONS 2 to 9	

IP7008302

CHECK SHEET ISSUE STATUS AND COMPLETION RECORD

CONTRACT	INTERMOUNTAIN	UNIT NO:	1	ST NO:	11246
CHECKLIST NO:	1175				
SECTION NO:	6	TITLE:	HP CYLINDER - REBUILD		
					Sheet 1 of 2

PAGE NO	SHEET NO	DESCRIPTION	ISSUE	TS ENGR
6.1	HP20/001	HP Rotor bumping clearance and axial datums	A	
6.2	HP20/026	HP Inner cylinder to rotor axial datums - unboxed	A	
6.3	HP20/027	HP Inner & Outer cylinder/rotor radial datums - unboxed	A	
6.4	HP20/009	HP Inner cylinder/rotor radial datums - boxed	A	
6.5	HP20/018	HP/IP Rotor to casing vertical datums unboxed	A	
6.6	HP20/013	HP rotor to Front pedestal axial datum	A	
6.7	PD15/008	HP Rotor to Thrust pedestal axial datum	A	
6.8/6.9	HP11/036	HP Disc & diaphragm axial & radial clearances (2 Sheets)	A	
6.10	HP11/035	HP Rotor spill strip to shrouding clearances	A	
6.11	HP02/005	HP Shaft end gland clearances - box A Front	A	
6.12	HP02/005	HP Exhaust shaft gland clearances - box B Front	A	
6.13	HP02/005	HP Shaft cylinder gland clearances - box D Rear	A	
6.14	HP02/005	HP Shaft end gland clearances - box E Rear	A	
6.15	HP/CL2	HP Shaft gland box axial clearances - FRONT	A	
6.16	HP/CL1	HP Shaft gland box axial clearances - REAR	A	
6.17	HP05/007	HP Exhaust end gland 'B' carrier key clearances	A	
6.18	HP08/001	HP Gland box to cylinder half joint steps - boxes A, B, C & E	A	
6.19	HP24/028	HP Inner/Outer cyl half joint steps, axial & side datums	A	
6.20/6.22	PD09/002	HP Rotor radial bore readings	A	
6.23	HP02/011	HP Gland bore and joint gap checks - boxes A, B, D & E	A	
6.24	HP01/001	HP Shaft Gland Ring Butt Clearances	A	

CHECK SHEET ISSUE STATUS AND COMPLETION RECORD

CONTRACT	INTERMOUNTAIN	UNIT NO:	1	ST NO:	11246
CHECKLIST NO:	1175				
SECTION NO:	6	TITLE:	HP CYLINDER - REBUILD		

Sheet 2 of 2

PAGE NO	SHEET NO	DESCRIPTION	ISSUE	TS ENGR
6.25	HP/CL3	HP Gland axial & radial mismatch - boxes A, D & E	A	
6.26	HP24/024	HP Outer cylinder joint gaps unbolted	A	
6.27	HP27/015	HP Steam inlet clearances	A	
6.28	HP27/019	HP Heater connection assembly	A	
6.29	HP27/020	HP Heater connection flange clearances	A	
6.30	HP27/019	HP leak off for IP rotor cooling connection assembly	A	
6.31-32	HP26/008	HP Inner to outer cylinder key clearances (2 Sheets)	A	
6.33	HP28/002	HP inner to outer cylinder baffle clearances	A	
6.34-35	HP23/010	HP Cylinder Thrust key and paw grip clearances (2 Shts)	A	
6.36	HP23/005	HP Cylinder Thrust key & support packer thicknesses	A	
6.37	HP21/003	HP Cylinder to pedestal centre line key clearances	A	
6.38	HP25/001	HP Cylinder component bolts - torque settings	A	
6.39-40	HP25/002	Controlled tightening of HP Inner cylinder bolts (2 Sheets)	A	
6.41-43	HP16/007	HP outer shell distortion correction factors - laser measurement	A	
6.44	HP18/001	HP Inner cylinder final box-up checks	A	
6.45	HP18/001	HP Outer cylinder final box-up checks	A	

Title **HP/IP ROTOR BUMPING CLEARANCE & AXIAL COLD DATUMS**

Contract **INTERMOUNTAIN** Unit No. **1** Serial No. **11246**

Site Issue **A** Date **21/3/02** Checked **BI** Check List No. **1175**

Taken by **MLS/BG** Date **19/3/03** Supervisor **MLS/BG** Date **19/3/03** Approved Date

Readings in inches

SHAFT IDENTIFICATION No.:	RF 113218
---------------------------	-----------

CYLINDER CONDITION	UNBOXED	BOXED (inner cyl +B gland only available)
DATUM WITH ROTOR HARD TO FRONT	9.808	9.660
ROTOR EXPANDING CLEARANCE (DESIGN .175)	0.152	0.300
DATUM WITH ROTOR HARD TO REAR	10.082	10.166
ROTOR CONTRACTING CLEARANCE (DESIGN .165)	0.122	0.206
TOTAL FLOAT (DESIGN .340)	0.274	0.506

Contacting:- Unboxed - To the REAR - Gland ring D4 To the FRONT - Gland ring E2
Boxed - inner cylinder Inlet gland 'C' expanding and contracting

EXTERNAL COLD DATUMS

FRONT-END THROWER TO GLAND	L.H.S.	N/A
	R.H.S.	N/A
REAR-END THROWER TO GLAND	L.H.S.	N/A
	R.H.S.	N/A

DISTANCE BETWEEN THE BACK FACE OF THE HP REAR COUPLING AND THE MIDDLE STANDARD, AT THE T2 BEARING HOUSING AXIAL LOCATION IN THE MIDDLE STANDARD	9.960 * (build working datum - see below for FINAL datum)
POSITION AT WHICH READING WAS TAKEN	LHS - just below half joint

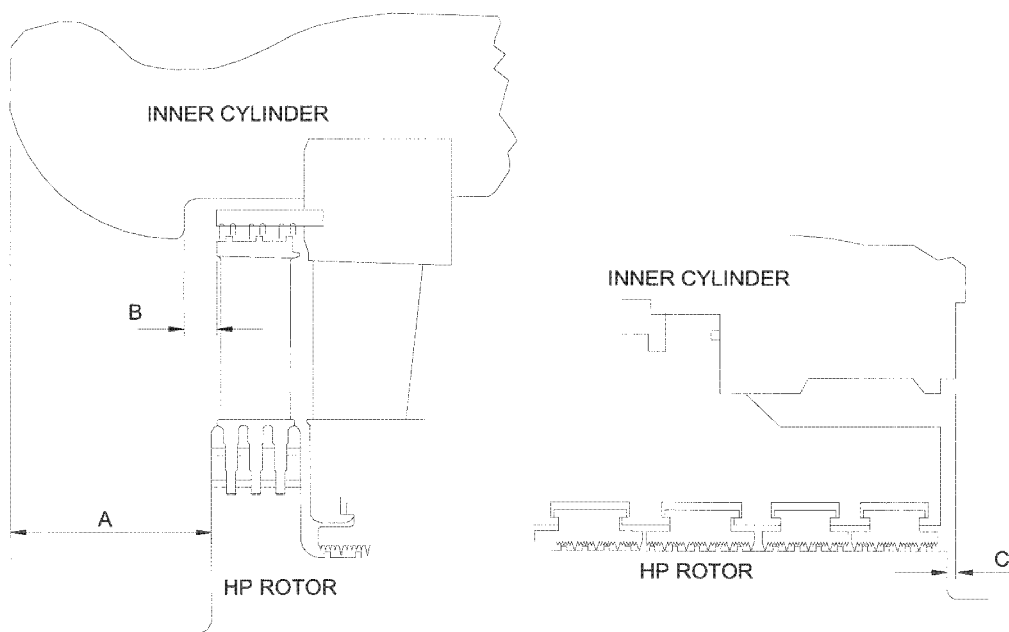
* FINAL AXIAL DATUM AFTER ADJUSTMENT FOR THE IP FINAL POSITION = **10.086"** (24/3/2003)

Title **HP INNER CYLINDER TO ROTOR AXIAL DATUMS - UNBOXED**

Contract **INTERMOUNTAIN** Unit No. **1** Serial No. **11246**

Site Issue **A** Date **12/02/02** Checked **BI** Check List No. **1175**

Taken by **B Grierson** Date **9/3/03** Supervisor Date Approved Date



Readings in inches

	FRONT A		FRONT B		REAR C	
	SHOP	SITE	SHOP	SITE	SHOP	SITE
LHS	---	No access at site	.507	.510	1.057	1.055
BOTT	---		---	N/R	---	N/R
RHS	---		.504	.506	1.055	1.051

6 - HP REBUILD

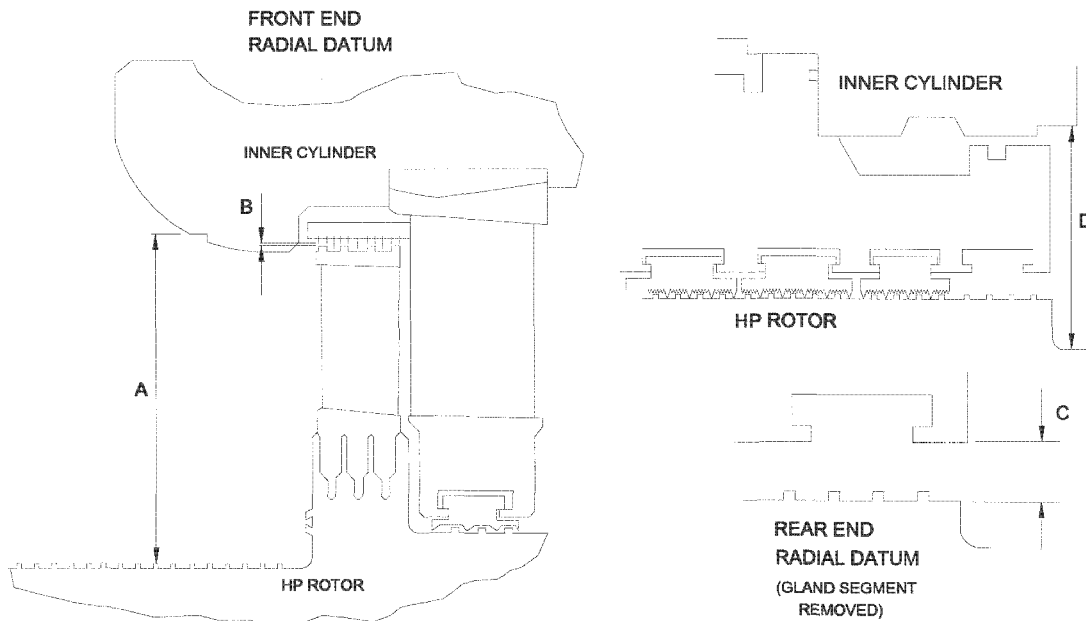
IP7008307

Title **HP INNER CYLINDER/ROTOR RADIAL DATUMS - UNBOXED**

Contract **INTERMOUNTAIN** Unit No. **1** Serial No. **11246**

Site Issue **A** Date **12/02/02** Checked **BI** Check List No. **1175**

Taken by **B Grierson** Date **9/3/03** Supervisor Date Approved Date



Readings in inches

	FRONT A		FRONT B		REAR C		REAR D	
	SHOP	SITE	SHOP	SITE	SHOP	SITE	SHOP	SITE
LHS	---	No access at site	0.034	0.036	.707	.705	6.003	6.001
BOTT	---		0.028	No access	.700	No access	No access	No access
RHS	---		0.034	0.032	.705	.708	6.002	6.004

6 - HP REBUILD

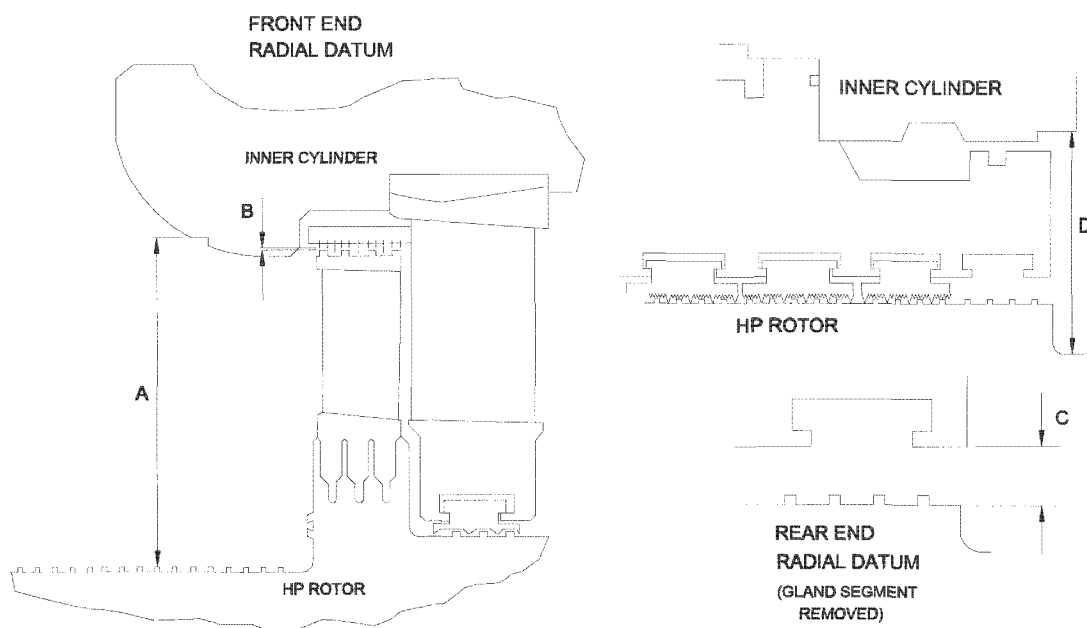
IP7008308

Title **HP INNER CYLINDER/ROTOR RADIAL DATUMS - BOXED**

Contract **INTERMOUNTAIN** Unit No. **1** Serial No. **11246**

Site Issue **A** Date **12/02/02** Checked **BI** Check List No. **1175**

Taken by **B Grierson** Date **20/3/03** Supervisor Date Approved Date



Readings in inches

	FRONT A		FRONT B		REAR C		REAR D	
	SHOP	SITE	SHOP	SITE	SHOP	SITE	SHOP	SITE
LHS (BOTT)	---	No access	---	No access	---	Not applicable	6.003	6.001
BOTT	---		---		---		---	No access
RHS (BOTT)	---		---		---		6.002	6.004
TOP	---		---		---		6.012	6.006

6 - HP REBUILD

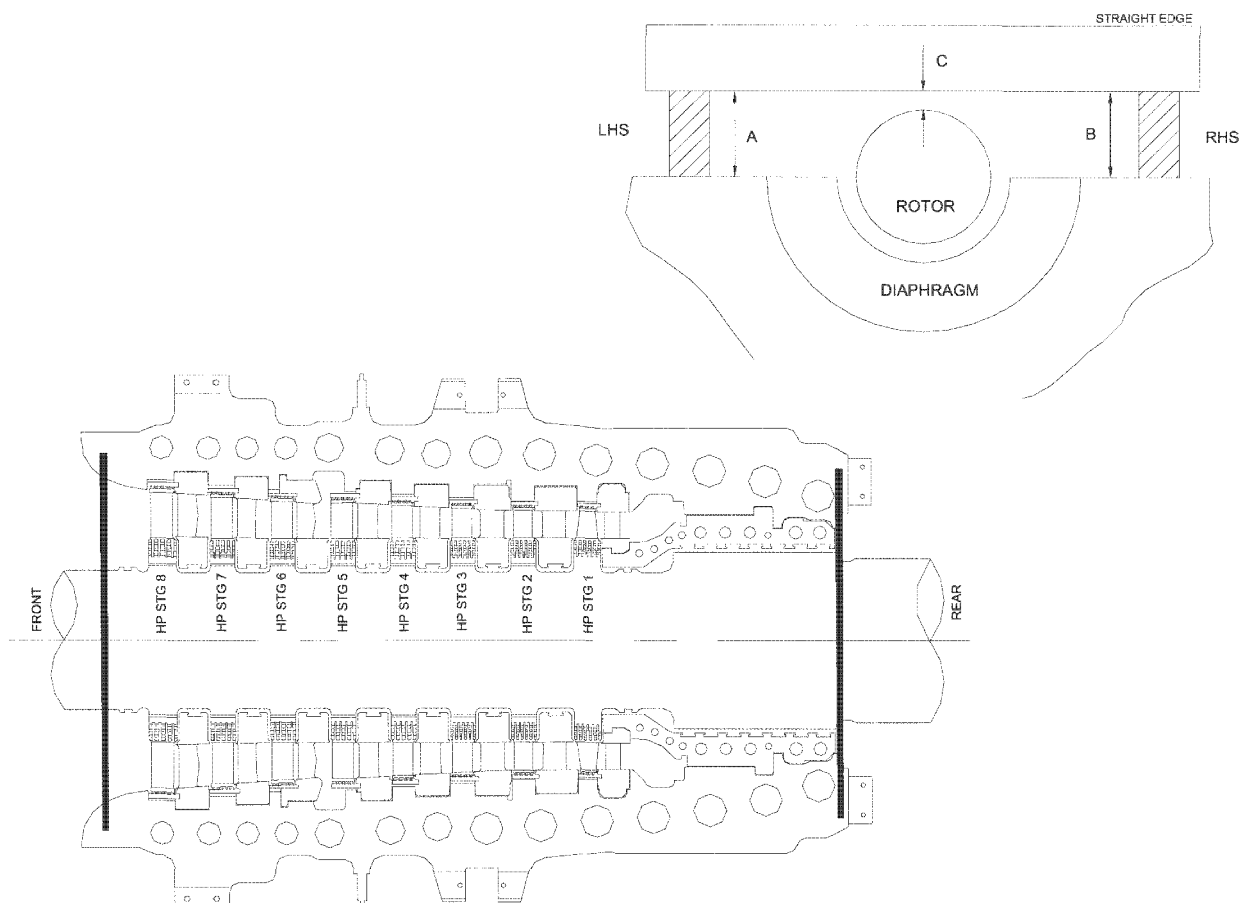
IP7008309

Title **HP/IP ROTOR TO CASING VERTICAL DATUMS - UNBOXED**

Contract **INTERMOUNTAIN** Unit No. **1** Serial No. **11246**

Site Issue **A** Date **12/02/02** Checked **BI** Check List No. **1175**

Taken IPSC Date 19/3/03 Supervisor M Storey Date 19/3/03 Approved Date



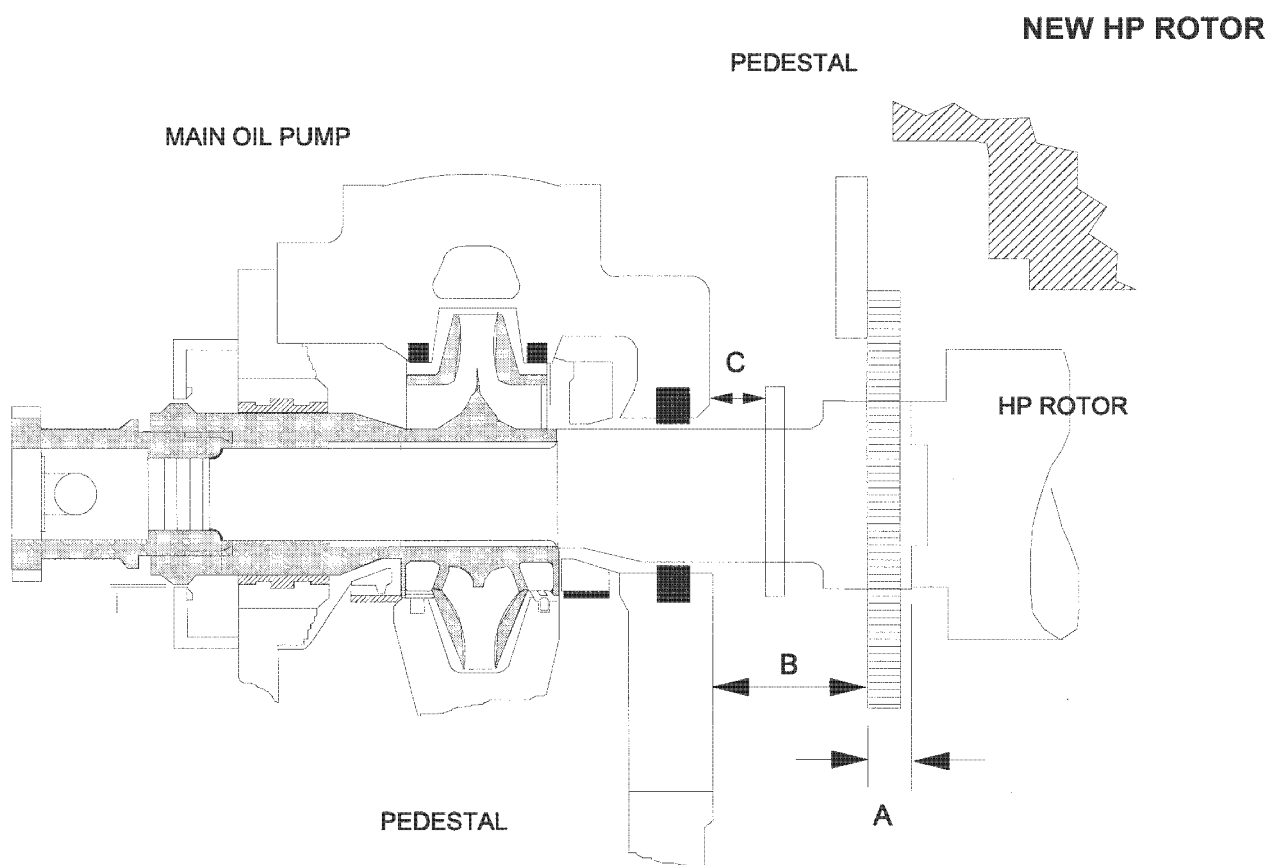
Note: Vertical datum measurement taken with rotor / gland bottom build clearances established and without any compensation for bolt up. Readings are with the outer cylinder on Build keys

POSITION	A	B	C	*Works build adjusted	Difference Site/Works	Tops off/ Tops on Change
HP DIAPHRAGM St. 8	13.812	13.8115	1.9545	2.068	2.069	-0.008
HP INLET GLAND	14.813	14.8135	1.326	1.335	1.326	+ 0.005

* Works build figures adjusted for difference in straight edge support block dimensions.
Vertical error corrected by later adjustment on running keys

Title **ROTOR TO FRONT PEDESTAL AXIAL DATUM**

Contract **INTERMOUNTAIN** Unit No. **1** Serial No. **11246**
 Site Issue **A** Date **17/02/02** Checked **BI** Check List No. **1175**
 Taken by **W Falconer** Date **26/3/03** Supervisor Date Approved Date



ROTOR IN COLD SET POSITION PUSHED TO **FRONT**

Readings in inches

DATUM		POSITION
A	N/A	
B	8.111	Pump casing to Wheel - LHS just below half joint
C	1.138	Pump casing to collar - LHS just below half joint

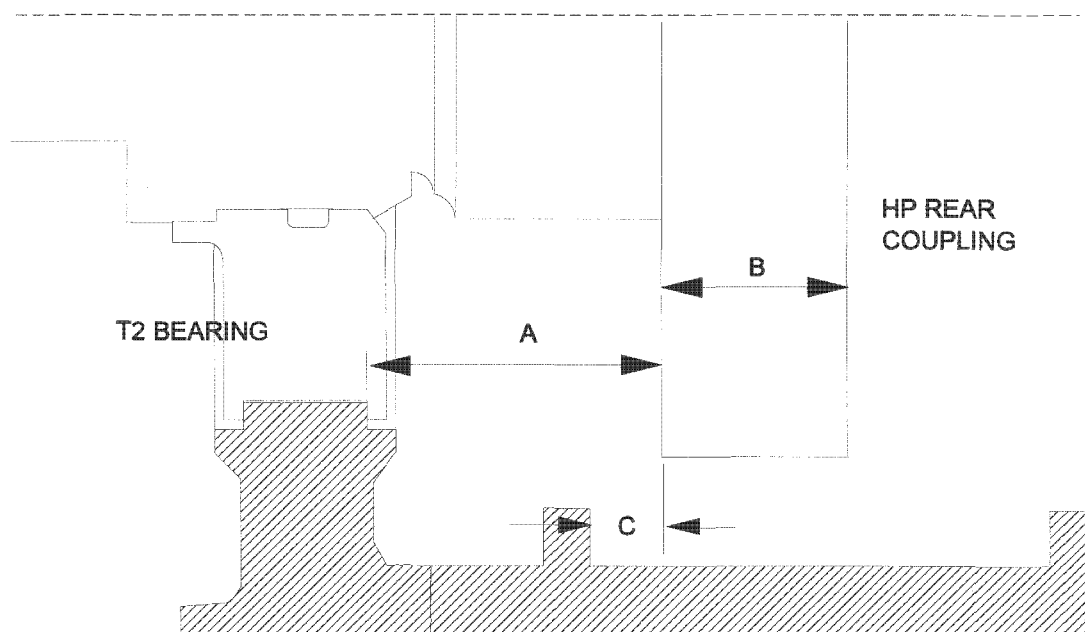
6 - HP REBUILD

IP7008311

Title **HP ROTOR TO THRUST PEDESTAL AXIAL DATUM**

Contract	INTERMOUNTAIN		Unit No.	1	Serial No.	11246
Site Issue	A	Date	17/02/02	Checked	BI	Check List No.
Taken by	Date	Supervisor	Date	Approved	Date	

HP ROTOR AXIAL DATUM IN THRUST PEDESTAL



ROTORS IN COLD SET POSITION PUSHED TO THE **FRONT**

Readings in inches

DATUM	NEW ROTOR	POSITION
A	Working datum 9.960 FINAL datum 10.086	LHS
B	N/R	N/A
C	N/R	

6 - HP REBUILD

IP7008312

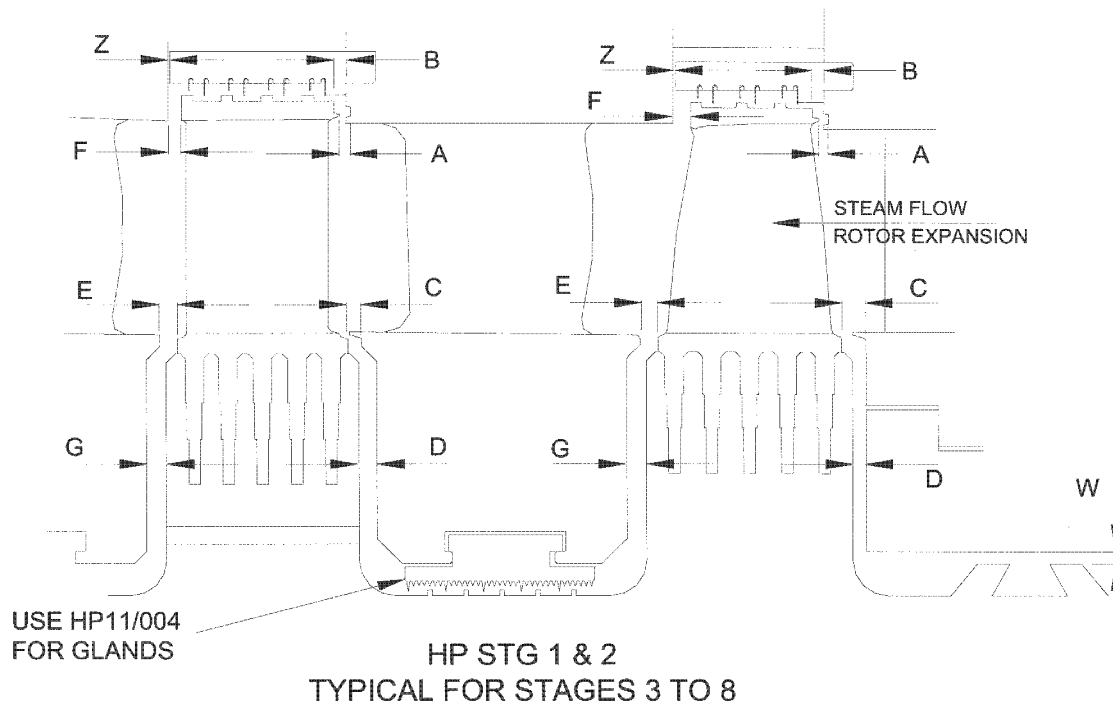
Title **HP DIAPHRAGM & WHEEL CLEARANCES**

Contract **INTERMOUNTAIN** Unit No. **1** Serial No. **11246**

Site Issue **A** Date **17/02/02** Checked **BI** Check List No. **1175**

Taken by _____ Date _____ Supervisor _____ Date _____ Approved _____ Date _____

REF DRAWING : R277/1338 REV B



ALL AXIAL CLEARANCES TAKEN WITH ROTOR IN COLD SET POSITION.
MINIMUM CLEARANCE TO BE RECORDED.

Title **H.P. DIAPHRAGM & WHEEL CLEARANCES**

Contract **INTERMOUNTAIN** Unit No. **1** Serial No. **11246**
 Site Issue **A** Date **17/02/02** Checked **BI** Check List No. **1175**
 Taken by As works build Date Supervisor Date Approved Date

REF DRAWING: R277/1338 REV B

ROTOR AXIAL DATUM = **9.960**
 (HP Coupling to T2 Bearing)

(F= Front End, R= Rear End)

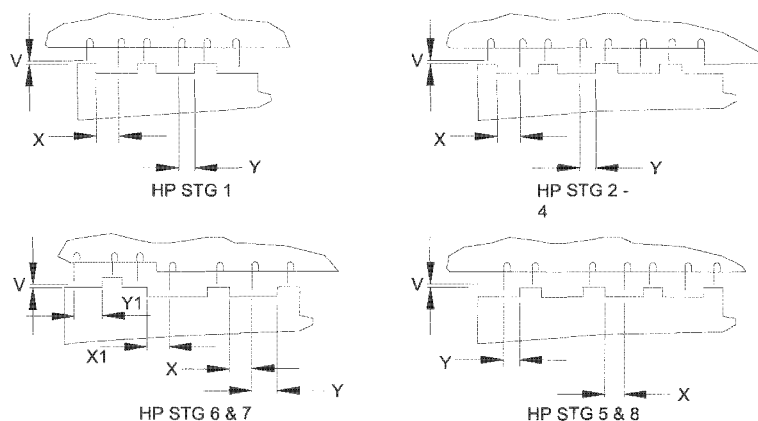
Readings in inches

BLADING STAGE			8	7	6	5	4	3	2	1
A	DESIGN		.224				.221	.213	.197	.185
	ACTUAL	LHS	SEE WORKS BUILD SECTION 5 PAGE 8							
		RHS								
B	DESIGN		.264			.260	.252	.236	.224	
	ACTUAL	LHS	SEE WORKS BUILD SECTION 5 PAGE 8							
		RHS								
C	DESIGN		.268	.287	.299	.295	.287	.283	.213	
	ACTUAL	LHS	SEE WORKS BUILD SECTION 5 PAGE 8							
		RHS								
D	DESIGN		.343	.366	.378	.382	.374	.276		
	ACTUAL	LHS	SEE WORKS BUILD SECTION 5 PAGE 8							
		RHS								
E	DESIGN		.634	.496	.484	.472	.453	.429	.406	
	ACTUAL	LHS	SEE WORKS BUILD SECTION 5 PAGE 8							
		RHS								
F	DESIGN		.500	.496	.484	---	.453	.429	.406	
	ACTUAL	LHS		SEE WORKS BUILD SECTION 5 PAGE 8						
		RHS								
G	DESIGN		.823	.547	.524	.504	.480	.457		
	ACTUAL	LHS		SEE WORKS BUILD SECTION 5 PAGE 8						
		RHS								
Z	DESIGN		.039			1.496	.039			
	ACTUAL	LHS	SEE WORKS BUILD SECTION 5 PAGE 8							
		RHS								
W	DESIGN		'B' GLAND DESIGN = .427				'C' GLAND DESIGN = .315			
	ACTUAL	LHS	Not measured				SEE SECTION 5.8			
		RHS	"				"			

Title **HP ROTOR SPILL STRIP TO SHROUDING CLEARANCES**

Contract **INTERMOUNTAIN** Unit No. **1** Serial No. **11246**
 Site Issue **A** Date **17/02/02** Checked **BI** Check List No. **1175**
 Taken by As works build Date Supervisor Date Approved Date

REF DRAWING: R277/1338
 REV B



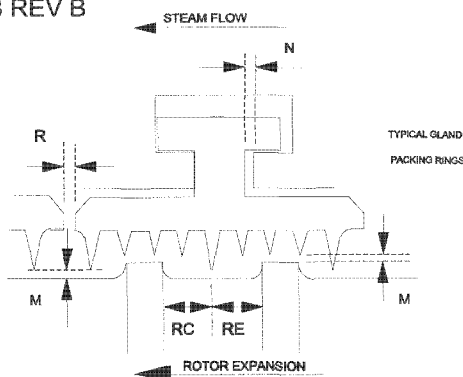
BLADING STAGE			8	7	6	5	4	3	2	1
V	TOP	DES	.031	.030	.028	.028	.028	.028	.043	.028
		ACT	See Section 5 Page 9							
	BOT	DES	.031	.030	.028	.028	.028	.028	.043	.028
		ACT	See Section 5 Page 9							
	DESIGN		.031	.030	.028	.028	.028	.028	.043	.028
	LHS	ACT	See Section 5 Page 9							
	RHS	ACT	"							
X	DESIGN		.244	.315	.354	.240	.240	.240	.220	.228
	ACTUAL	LHS	See Section 5 Page 9							
		RHS	"							
X1	DESIGN		----	.276	.236	----	----	----	----	----
	ACTUAL	LHS	----	See Section 5 Page 9		----	----	----	----	----
		RHS	----			----	----	----	----	----
Y	DESIGN		.476	.563	.610	.429	.421	.421	.385	.441
	ACTUAL	LHS	See Section 5 Page 9							
		RHS	"							
Y1	DESIGN		----	.488	.437	----	----	----	----	----
	ACTUAL	LHS	----	See Section 5 Page 9		----	----	----	----	----
		RHS	----	"		----	----	----	----	----

Title **HP SHAFT END GLAND CLEARANCES - BOX A FRONT**

Contract **INTERMOUNTAIN** Unit No. **1** Serial No. **11246**
 Site Issue **A** Date **17/02/02** Checked **BI** Check List No. **1175**
 Taken by **BG/MLS** Date **March 03** Supervisor **BG/MLS** Date **Mar 03** Approved Date

REF DRAWING :- R277/1338 REV B

ROTOR AXIAL DATUM = **9.960**
 (HP Coupling to T2 Bearing)



ALL CLEARANCES TAKEN WITH ROTOR IN COLD SET POSITION.

MINIMUM CLEARANCE TO BE RECORDED.

SEGMENTS TO BE PUSHED IN DIRECTION OF STEAM FLOW.

RE REDUCES WHEN ROTOR EXPANDS FASTER THAN CASING WITH THRUST AS FIXED DATUM.

(F= Front End, R= Rear End)

RC REDUCES WHEN ROTOR CONTRACTS FASTER THAN CASING WITH THRUST AS FIXED DATUM.

Readings in inches

GLAND RING NO.			A1 F	A2 R
RE (L)	DESIGN		.550	.550
	LHS		0.595	0.564
	RHS		0.595	0.564
RC (O)	DESIGN		.290	.290
	LHS		0.264	0.280
	RHS		0.248	0.280
M	TOP	DES	.025	.025
		ACT	.038*	.037*
	BOT	DES	.025	.025
		ACT	.032**	.032**
	LHS	DES	.025	.025
		ACT	.020	.021
	RHS	DES	.025	.025
		ACT	.024	.029
N	DESIGN		---	---
	LHS			
	RHS			
R	DESIGN		---	---
	LHS			
	RHS			

* From top lead (uncorrected)

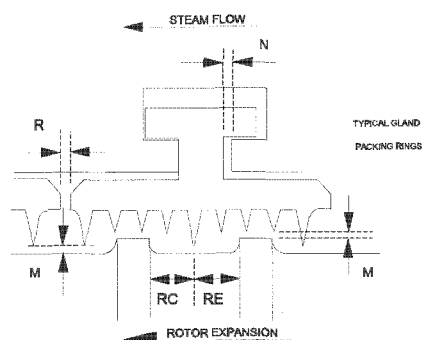
** From tape-on-rotor check (uncorrected)

Title **HP EXHAUST SHAFT GLAND CLEARANCES - BOX B FRONT**

Contract **INTERMOUNTAIN** Unit No. **1** Serial No. **11246**
 Site Issue **A** Date **17/02/02** Checked **BI** Check List No. **1175**
 Taken by **BG/MLS** Date **March 03** Supervisor **BG/MLS** Date **Mar 03** Approved Date

REF DRAWING :- R277/1338 REV B

ROTOR AXIAL DATUM = **9.960**
 (HP Coupling to T2 Bearing)



ALL CLEARANCES TAKEN WITH ROTOR IN COLD SET POSITION.

MINIMUM CLEARANCE TO BE RECORDED.

SEGMENTS TO BE PUSHED IN DIRECTION OF STEAM FLOW.

RE REDUCES WHEN ROTOR EXPANDS FASTER THAN CASING WITH THRUST AS FIXED DATUM.

(F= Front End, R= Rear End)

RC REDUCES WHEN ROTOR CONTRACTS FASTER THAN CASING WITH THRUST AS FIXED DATUM.

Readings in inches

GLAND RING NO.			B1	B2	B3	B4	B5
RE (L)	DESIGN		.550	.550	.550	.550	.550
	LHS		0.564	0.564	0.579	0.579	0.579
	RHS		0.579	0.564	0.579	0.579	0.579
RC (O)	DESIGN		.290	.290	.290	.290	.290
	LHS		0.280	0.280	0.249	0.249	0.249
	RHS		0.280	0.264	0.249	0.249	0.249
M	TOP	DES	.020	.020	.020	.020	.020
		ACT	.022*	.023*	.023*	.024*	.023*
	BOT	DES	.020	.020	.020	.020	.020
		ACT	.018	.017	.016	.016	.017
	LHS	DES	.020	.020	.020	.020	.020
		ACT	.016/.016	.015/.015	.015/.014	.012/.011	.011/.011
	RHS	DES	.020	.020	.020	.020	.020
		ACT	.019/.019	.021/.021	.023/.022	.021/.020	.020/.019
Readings are Long fin/short fin							
N	DESIGN						
	RHS						
R	DESIGN						
	LHS						
	RHS						

* Top lead minus nominal TO/TO shift allowance

Title **HP SHAFT CYLINDER GLAND CLEARANCES - BOX D REAR**

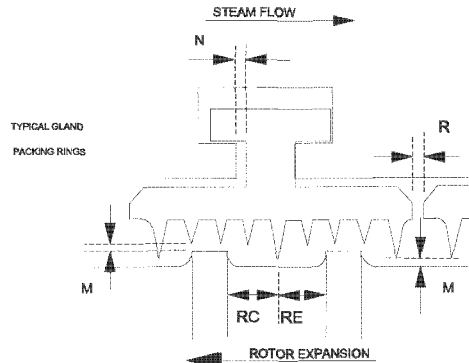
Contract **INTERMOUNTAIN** Unit No. **1** Serial No. **11246**

Site Issue **A** Date **17/02/02** Checked **BI** Check List No. **1175**

Taken by **MLS/BG** Date **March 03** Supervisor **MLS/ BG** Date **Mar 03** Approved Date

REF DRAWING :- R277/1338 REV B

ROTOR AXIAL DATUM = **9.960**
(HP Coupling to T2 Bearing)



ALL CLEARANCES TAKEN WITH ROTOR IN COLD SET POSITION.

MINIMUM CLEARANCE TO BE RECORDED.

SEGMENTS TO BE PUSHED IN DIRECTION OF STEAM FLOW.

RE REDUCES WHEN ROTOR EXPANDS FASTER THAN CASING WITH THRUST AS FIXED DATUM.

(F= Front End, R= Rear End)

RC REDUCES WHEN ROTOR CONTRACTS FASTER THAN CASING WITH THRUST AS FIXED DATUM.

Readings in inches

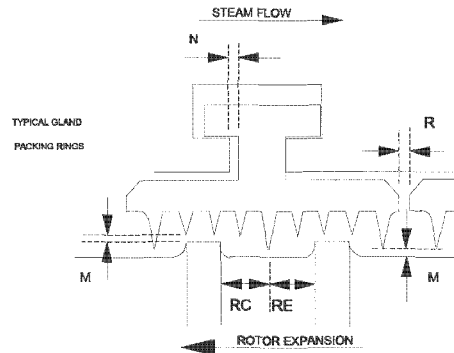
GLAND RING NO.			D1	D2	D3	D4
RE (L)	DESIGN		.180	.180	.180	.180
	LHS		.165	.180	.165	.195
	RHS		.170	.193	.180	.182
RC (O)	DESIGN		.170	.170	.170	.170
	LHS		.135	.129	.135	.120
	RHS		.142	.130	.143	.135
M	TOP	DES	.020	.020	.020	.020
		ACT	-	-	-	-
	BOT	DES	.020	.020	.020	.020
		ACT	.025	.030	.025	.025
	LHS	DES	.020	.020	.020	.020
		ACT	.020/.020	.019/.019	.020/.020	.016/.016
	RHS	DES	.020	.020	.020	.020
		ACT	.018/.019	.017/.017	.020/.018	.023/.023
N	DESIGN		----	----	----	----
	LHS					
	RHS					
R	DESIGN		----	----	----	----
	LHS					
	RHS					

Title **HP SHAFT END GLAND CLEARANCES - BOX E REAR**

Contract **INTERMOUNTAIN** Unit No. **1** Serial No. **11246**
 Site Issue **A** Date **17/02/02** Checked **BI** Check List No. **1175**
 Taken by **MLS/BG** Date **March 03** Supervisor **MLS/BG** Date **Mar 03** Approved Date

REF DRAWING :- R277/1338 REV B

ROTOR AXIAL DATUM = **9.960**
 (HP Coupling to T2 Bearing)



ALL CLEARANCES TAKEN WITH ROTOR IN COLD SET POSITION.

MINIMUM CLEARANCE TO BE RECORDED.

SEGMENTS TO BE PUSHED IN DIRECTION OF STEAM FLOW.

RE REDUCES WHEN ROTOR EXPANDS FASTER THAN CASING WITH THRUST AS FIXED DATUM.

(F= Front End, R= Rear End)

RC REDUCES WHEN ROTOR CONTRACTS FASTER THAN CASING WITH THRUST AS FIXED DATUM.

Readings in inches

GLAND RING NO.			E1	E2
RE (L)	DESIGN		.175	.175
	LHS		.157	.157
	RHS		.157	.157
RC (O)	DESIGN		.165	.165
	LHS		.186	.186
	RHS		.186	.186
M	TOP	DES	.025	.025
		ACT	.047*	.044*
	BOT	DES	.025	.025
		ACT	.020**	.020**
	LHS	DES	.025	.025
		ACT	.025	.025
	RHS	DES	.025	.025
		ACT	.023	.025
N	DESIGN		-----	-----
	LHS			
	RHS			
R	DESIGN		-----	-----
	LHS			
	RHS			

* Top lead (corrected for TO/TO shift)

** From tape-on-rotor checks (corrected for TO/TO shift)

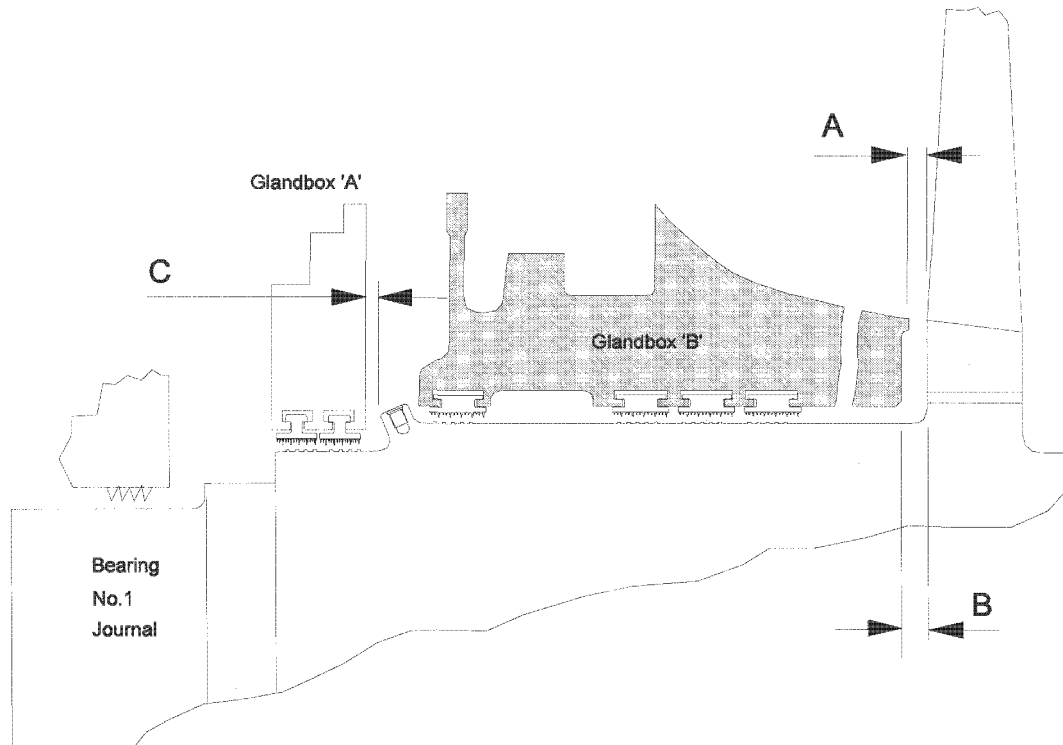
6 - HP REBUILD

IP7008319

Title **HP SHAFT GLAND BOX AXIAL CLEARANCES - FRONT**

Contract **INTERMOUNTAIN** Unit No. **1** Serial No. **11246**
 Site Issue **A** Date **17/02/02** Checked **BI** Check List No. **1175**
 Taken by **B Grierson** Date **20/3/03** Supervisor Date Approved Date

REF DRAWING :- R217/A0/1338 Rev. B



ROTOR AXIAL DATUM = **9.960**
 (HP Coupling to T2 Bearing)
 Readings in inches

ROTOR IN THE COLD SET POSITION PUSHED TO **FRONT**

POSITION	A (RE)	B (RE)	C (RE)	
DESIGN	.634	.823	.820	
LHS	.612	Not recorded	.782	
RHS	.607	Not recorded	.783	

RE = ROTOR EXPANDING CLEARANCE

RC = ROTOR CONTRACTING CLEARANCE

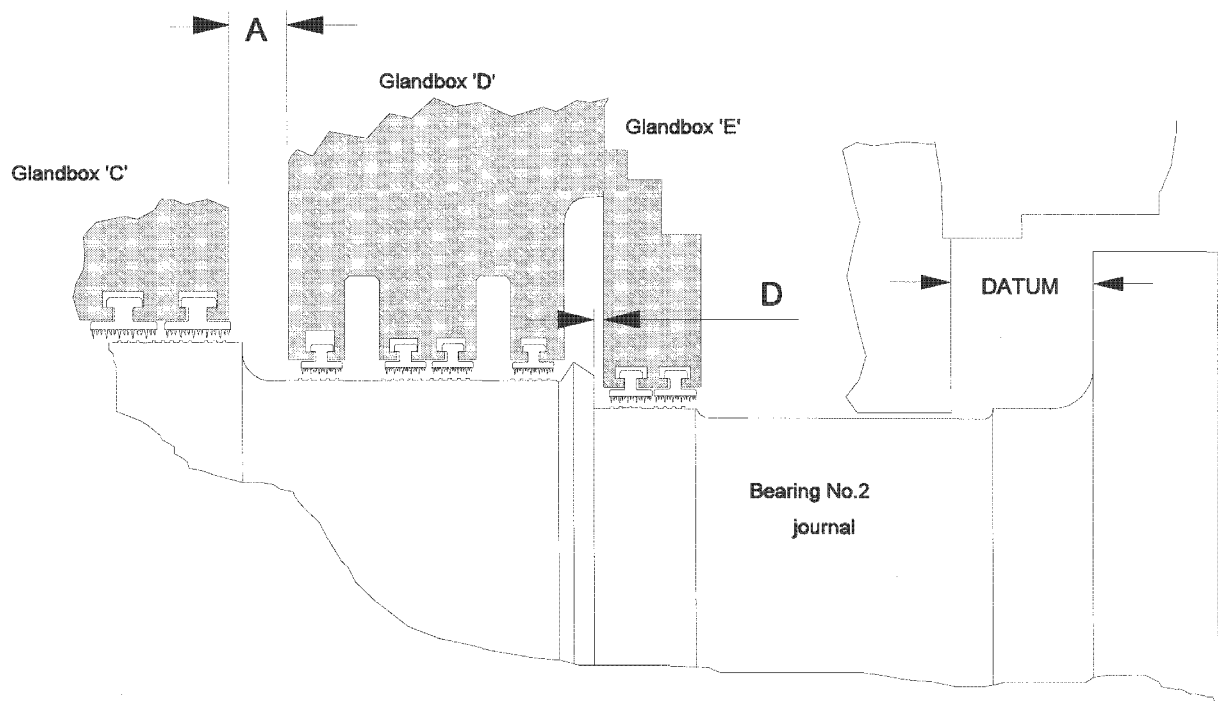
6 - HP REBUILD

IP7008320

Title **HP SHAFT GLAND BOX AXIAL CLEARANCES - REAR**

Contract **INTERMOUNTAIN** Unit No. **1** Serial No. **11246**
 Site Issue **A** Date **17/02/02** Checked **BI** Check List No. **1175**
 Taken by **B Grierson** Date **20/3/03** Supervisor **BG** Date **20/3/03** Approved Date

REF DRAWING :- R217/A0/1338 Rev. B



ROTOR AXIAL DATUM = **9.960**

(HP Coupling to T2 Bearing)

ROTOR IN THE COLD SET POSITION PUSHED TO **FRONT**

Readings in inches

POSITION	A	B (RC)	C (RE)	D (RC)
DESIGN		N/A	N/A	1.054
LHS	3.250	---	---	1.091
RHS	3.250	---	---	1.097

RE = ROTOR EXPANDING CLEARANCE

RC = ROTOR CONTRACTING CLEARANCE

6 - HP REBUILD

IP7008321

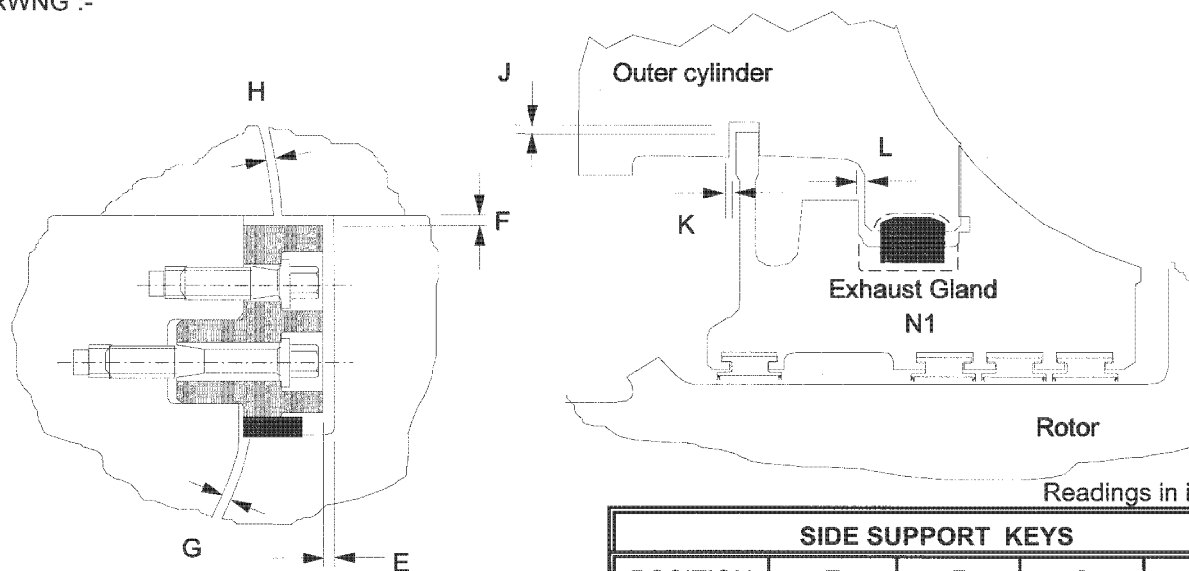
Title **HP EXHAUST END GLAND 'B' CARRIER KEY CLEARANCES**

Contract **INTERMOUNTAIN** Unit No. **1** Serial No. **11246**

Site Issue **A** Date **17/02/02** Checked **BI** Check List No. **1175**

Taken by **B Grierson** Date **18/3/03** Supervisor **BG** Date **18/3/03** Approved Date

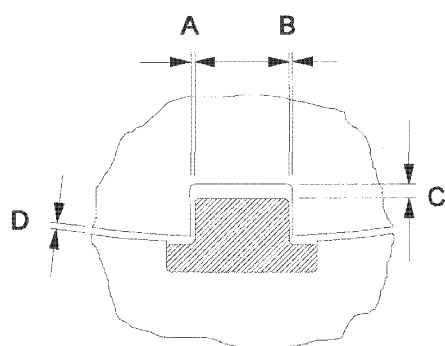
REF DRWNG :-



Readings in inches

Side support key

SIDE SUPPORT KEYS				
POSITION	E	F	G	H
DESIGN	---	---	---	---
LHS	.145	-.003	.127	NR
RHS	.062	-.003	.118	NR



Bottom Centralising key

BOTTOM CENTRALISING KEY			
POSITION	A + B	C	D
DESIGN	---	---	---
BOTTOM	.002	NR	NR

AXIAL LOCATION CLEARANCES						
POS	J		K		L	
DES	---		---		---	
	*	*	LHT	*	LH Top	*
LHS	*	*	RHT	*	RH Top	*
C/L	*	*	LHB	*	LH Bot	*
RHS	*	*	RHB	*	RH Bot	*

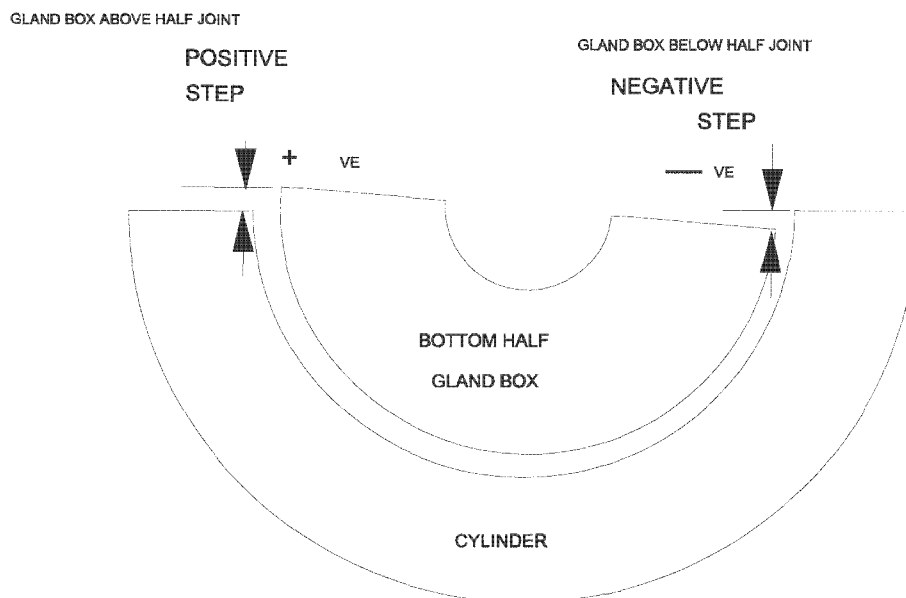
* Original packing head - no change

Title **HP GLAND BOX TO OUTER CYLINDER HALF JOINT STEPS**

Contract **INTERMOUNTAIN** Unit No. **1** Serial No. **11246**

Site Issue **A** Date **17/02/02** Checked **BI** Check List No. **1175**

Taken by **IPSC** Date **March 03** Supervisor **BG/MLS** Date Approved Date



POSITION AT WHICH READINGS ARE TAKEN TO BE MARKED 'X'

Readings in inches

	BOLT ON GLAND BOX A FRONT CORNER	BOLT ON GLAND BOX A REAR CORNER	EXHAUST GLAND BOX B FRONT CORNER	EXHAUST GLAND BOX B REAR CORNER	BOLT ON GLAND BOX E FRONT CORNER	BOLT ON GLAND BOX E REAR CORNER
LHS	-0.010	N/A	+0.003	-0.001	N/A	+0.028
RHS	+0.005	N/A	+0.001	-0.000	N/A	-0.024

NOTE + SIGN TO INDICATE BUSH PROUD OF CYLINDER HALF JOINT
- SIGN TO INDICATE BUSH BELOW CYLINDER HALF JOINT.

Title **HP INNER/OUTER CYL HALF JOINT STEPS, AXIAL & SIDE DATUMS**

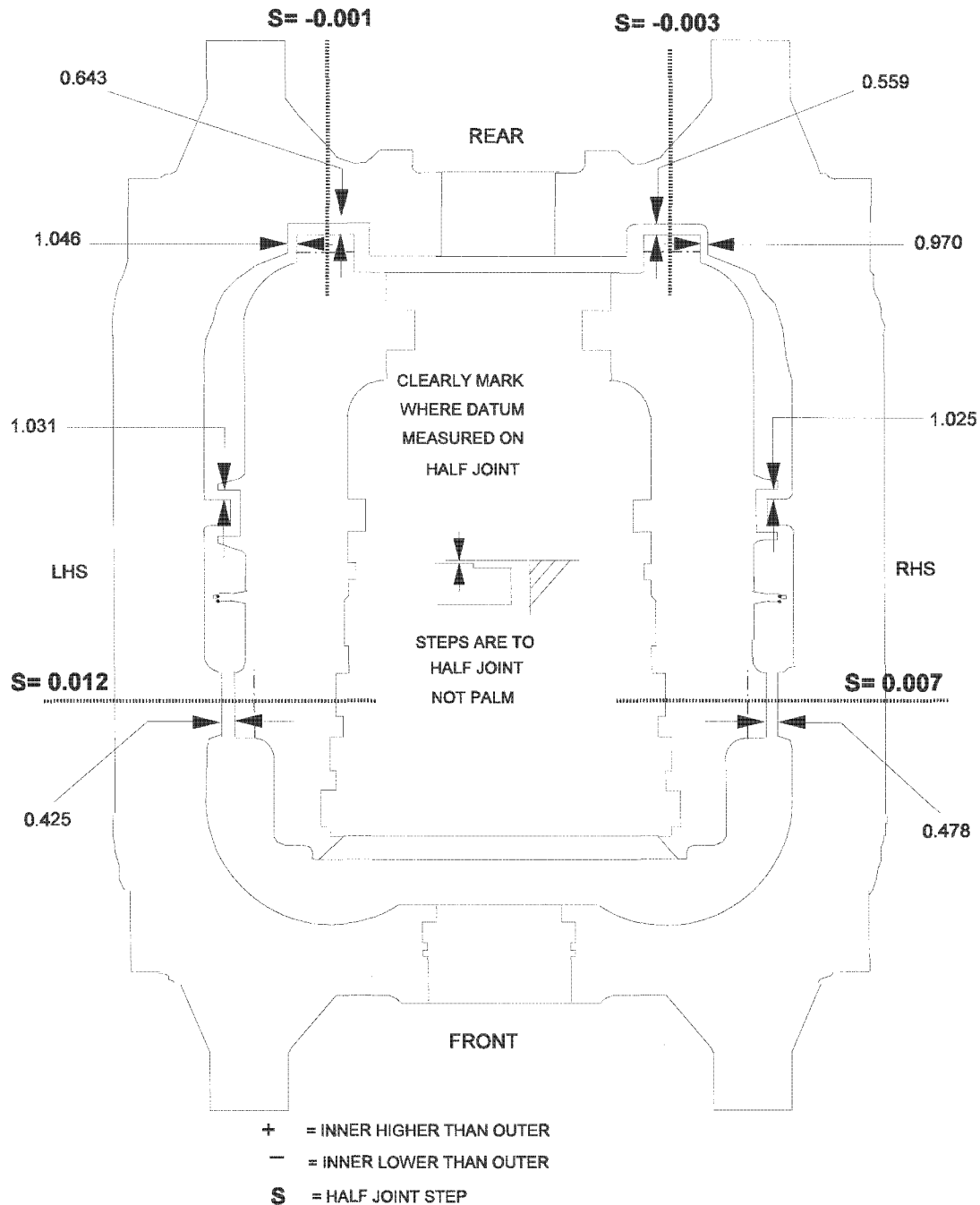
Contract **INTERMOUNTAIN** Unit No. **1** Serial No. **11246**

Site Issue **A** Date **17/02/02** Checked **BI** Check List No. **1175**

Taken by **IPSC** Date **9/3/03** Supervisor **M Storey** Date **9/3/03** Approved _____ Date _____

Readings X 0.001"

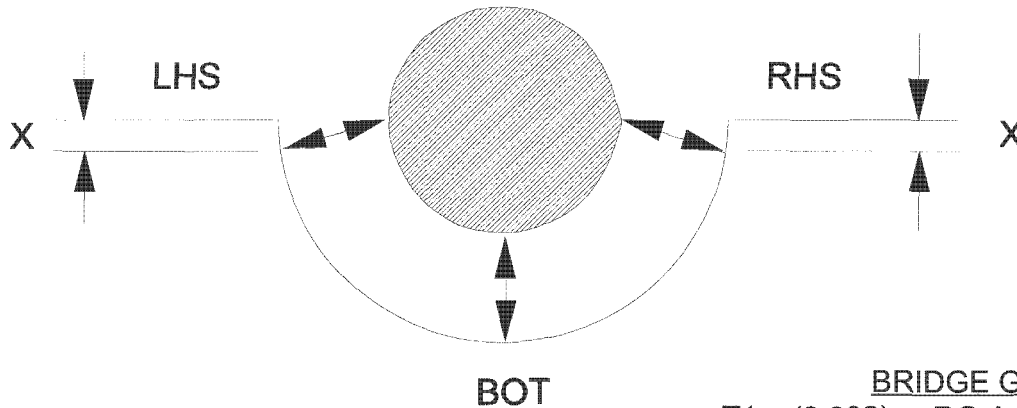
ROTOR / T2 AXIAL DATUM 9.952" (Note Final axial datum selected = 9.960")



6 - HP REBUILD

Title **HP ROTOR POSIT. RADIAL CHKS - ON BUILDING KEYS UNBOXED**

Contract **INTERMOUNTAIN** Unit No. **1** Serial No. **11246**
 Site Issue **A** Date **12/02/02** Checked **BI** Check List No. **1175**
 Taken by **IPSC** Date **17/3/03** Supervisor **MLS** Date **17-21 Mar** Approved Date



BRIDGE GAUGE

T1 (8.002) **BG 1.511** (8.004)

T2 (8.001) **BG 0.464** (8.003)

Bridge leg heights from standard half joint in brackets

DIMENSION X = FOR ALL SIDE DATUMS

Type Stamp Identification Letter on the Half Joints, in line with, and close to, the bore being measured from.

Readings in inches

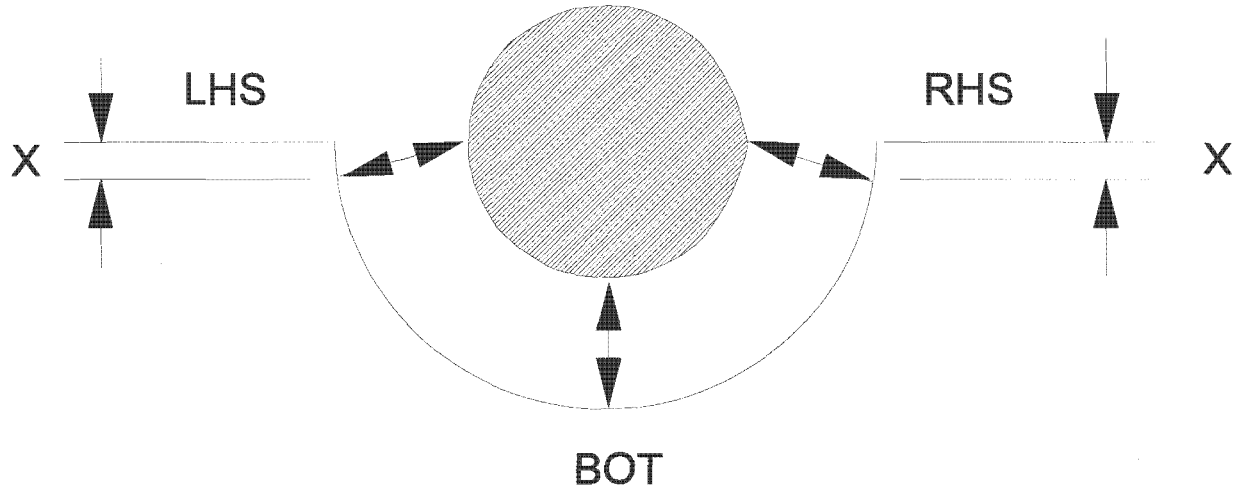
DATUM POSITION		UNBOXED DATUMS- ON BUILD KEYS - Rotor centred in brgs			COMMENTS
		LHS	BOT/TOP	RHS	
T1 PEDESTAL BORE		7.657	6.539	7.642	
FRONT BOLT-ON GLAND- SEGMENT REMOVED		0.878	0.874	0.883	
CYLINDER BORE - FRONT	TOP HALF	N/A	N/A	N/A	
	BOTT HALF		----		
CYLINDER BORE - REAR	TOP HALF	N/A	N/A	N/A	
	BOTT HALF		----		
REAR BOLT-ON GLAND- SEGMENT REMOVED		0.8715	0.892	0.874	
T2 PEDESTAL BORE		10.003	10.046	10.004	

RECORD SHEET PD09/002

Page No. 6.21

Title HP ROTOR POSITION RADIAL- ON BUILDING KEYS BOXED

Contract INTERMOUNTAIN Unit No. 1 Serial No. 11246
 Site Issue A Date 12/02/02 Checked BI Check List No. 1175
 Taken by B Grierson Date 23/3/03 Supervisor Date Approved Date



DIMENSION X = FOR ALL SIDE DATUMS

Type Stamp Identification Letter on the Half Joints, in line with, and close to, the bore being measured from.

Readings in inches

DATUM POSITION		BOXED DATUMS- ON BUILD KEYS			COMMENTS
		LHS	BOT/TOP	RHS	
T1 PEDESTAL BORE		N/A	N/A	N/A	
FRONT BOLT-ON GLAND- SEGMENT REMOVED		0.881	N/R	0.885	
CYLINDER BORE - FRONT	TOP HALF	---	9.658	---	
	BOTT HALF	---	N/A	---	
CYLINDER BORE - REAR	TOP HALF	---	8.170	---	
	BOTT HALF	---	N/A	---	
REAR BOLT-ON GLAND- SEGMENT REMOVED		0.875	N/R	0.882	
T1 PEDESTAL BORE		N/A	N/A	N/A	

Rotor centred in bearings

6 - HP REBUILD

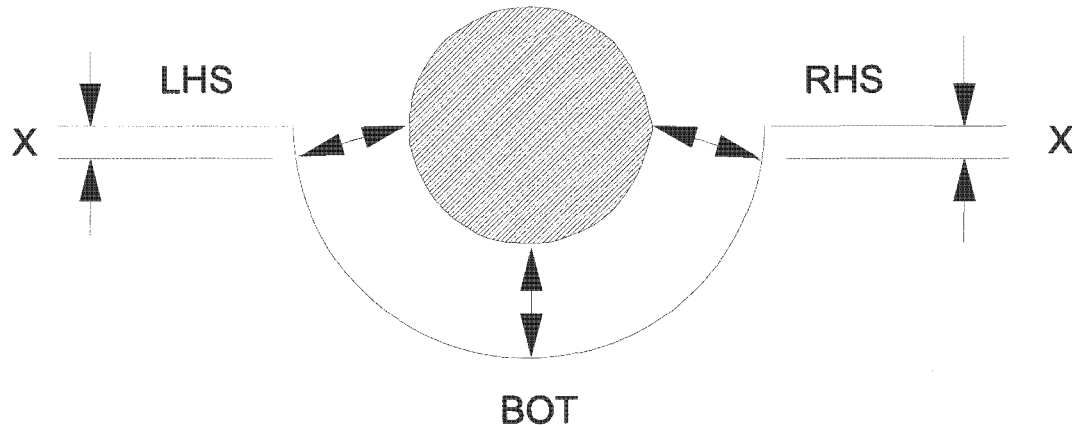
IP7008326

RECORD SHEET PD09/002

Page No. 6.22

Title HP ROTOR POSITION RADIAL- ON RUNNING KEYS BOXED

Contract INTERMOUNTAIN Unit No. 1 Serial No. 11246
 Site Issue A Date 12/02/02 Checked BI Check List No. 1175
 Taken by W Falconer Supervisor Date 26/3/03 Approved Date



DIMENSION X = FOR ALL SIDE DATUMS

Type Stamp Identification Letter on the Half Joints, in line with, and close to, the bore being measured from.

Readings in inches

DATUM POSITION		BOXED DATUMS- ON RUNNING KEYS			COMMENTS
		LHS	BOT/TOP	RHS	
T1 PEDESTAL BORE		N/A	N/A	N/A	
FRONT BOLT-ON GLAND- SEGMENT REMOVED		0.881	-	0.883	
CYLINDER BORE - FRONT	TOP HALF	-	9.6595	-	
	BOTT HALF	-	N/A	-	
CYLINDER BORE - REAR	TOP HALF	-	8.168	-	
	BOTT HALF	-	N/A	-	
REAR BOLT-ON GLAND- SEGMENT REMOVED		0.881	-	0.876	
T1 PEDESTAL BORE		N/A	N/A	N/A	

6 - HP REBUILD

IP7008327

RECORD SHEET HP02/011

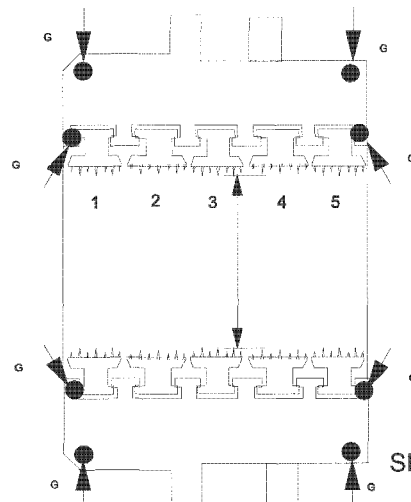
Page No. 6.23

Title **HP STEAM GLAND BORE CHECKS - BOXES 'A','B', 'D' & 'E'**

Contract **INTERMOUNTAIN** Unit No. **1** Serial No. **11246**

Site Issue **A** Date **17/02/02** Checked **BI** Check List No. **1175**

Taken by _____ Date _____ Supervisor _____ Date _____ Approved _____ Date _____



SF = Short Fin. LF = Long Fin. Readings in inches
F = Front End, R = Rear End

RING NO.	REQUD SIZE BOLTED	FIN	BORE - X			HALF JOINT GAP - G (0.001")				
			VERT BORE - V	HORIZONTAL			LHS		RHS	
				A	B			OUTER	INNER	INNER
A1	N/A	Bore				FRONT				
A2	N/A	Bore				REAR				
B1	N/A	Bore								
B2	N/A	Bore	Not measured			FRONT				
B3	N/A	Bore				REAR				
B4	N/A	Bore								
D1	N/A	Bore								
D2	N/A	Bore	Not measured			FRONT				
D3	N/A	Bore				REAR				
D4	N/A	Bore								
E1	N/A	Bore				FRONT				
E2	N/A	Bore				REAR				

6 - HP REBUILD

IP7008328

RECORD SHEET HP01/001

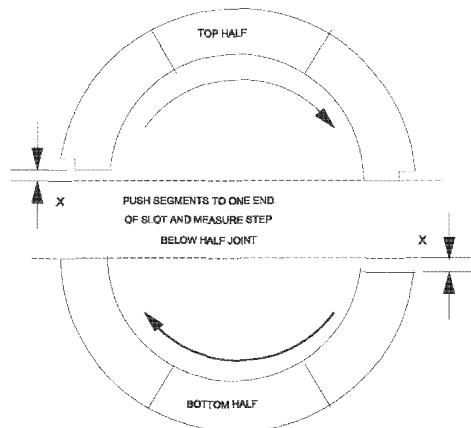
Page No. 6.24

Title **GLAND RING BUTT CLEARANCE FOR HP SHAFT GLANDS**

Contract **INTERMOUNTAIN** Unit No. **1** Serial No. **11246**

Site Issue **A** Date **17/02/02** Checked **BI** Check List No. **1175**

Taken by _____ Date _____ Supervisor _____ Date _____ Approved _____ Date _____



IRRESPECTIVE OF THE NUMBER OF SEGMENTS BUTT CLEARANCE 'X' IS THE CUMULATIVE TOTAL OF ALL SEGMENTS IN EACH HALF RING

Readings in inches

GLAND POSITION	RING NUMBER	BUTT CLEARANCE 'X'			
		DESIGN TOTAL	ACTUAL		
			TOP HALF	BOT HALF	TOTAL
'A'	1				
	2				
'B'	1				
	2				
	3				
	4				
	5				
'D'	1				
	2				
	3				
	4				
'E'	1				
	2				

6 - HP REBUILD

IP7008329

RECORD SHEET HP/CL3

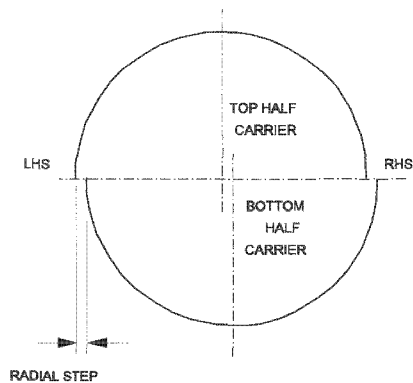
Page No. 6.25

Title **HP GLANDBOX AXIAL AND RADIAL MISMATCH - BOXES 'A', 'D' & 'E'**

Contract **INTERMOUNTAIN** Unit No. **1** Serial No. **11246**

Site Issue **A** Date **17/02/02** Checked **BI** Check List No. **1175**

Taken by _____ Date _____ Supervisor _____ Date _____ Approved _____ Date _____

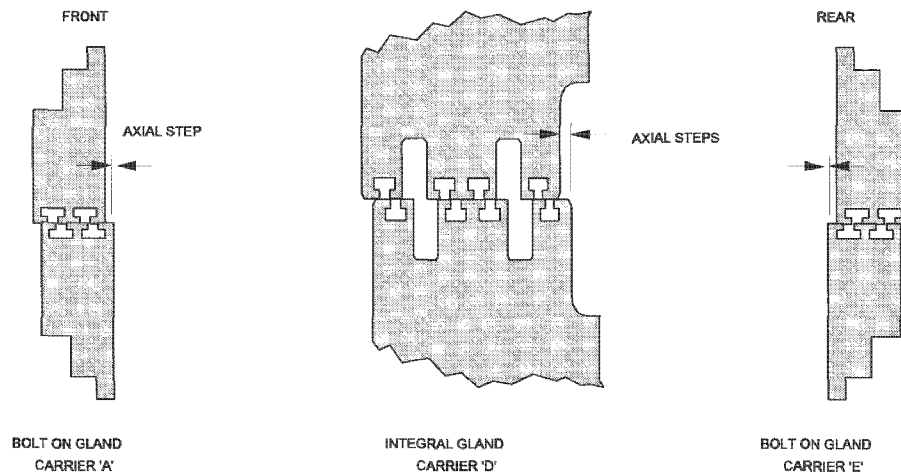


RADIAL OFFSET

Top half to the LHS read positive (+).
Top half to the RHS read negative(-).

AXIAL OFFSET

Top half to the front read positive (+)
Top half to the rear read negative(-).



Readings in inches

POSITION	RADIAL STEPS		AXIAL STEPS	
	LHS	RHS	LHS	RHS
Gland box 'A' Front	Refer to IPSC/Turbocare records		No significant mismatch	
Gland box 'A' Rear	"		"	
Gland box 'D' Front	"		"	
Gland box 'D' Rear	"		"	
Gland box 'E' Front	"		"	
Gland box 'E' Rear	"		"	

6 - HP REBUILD

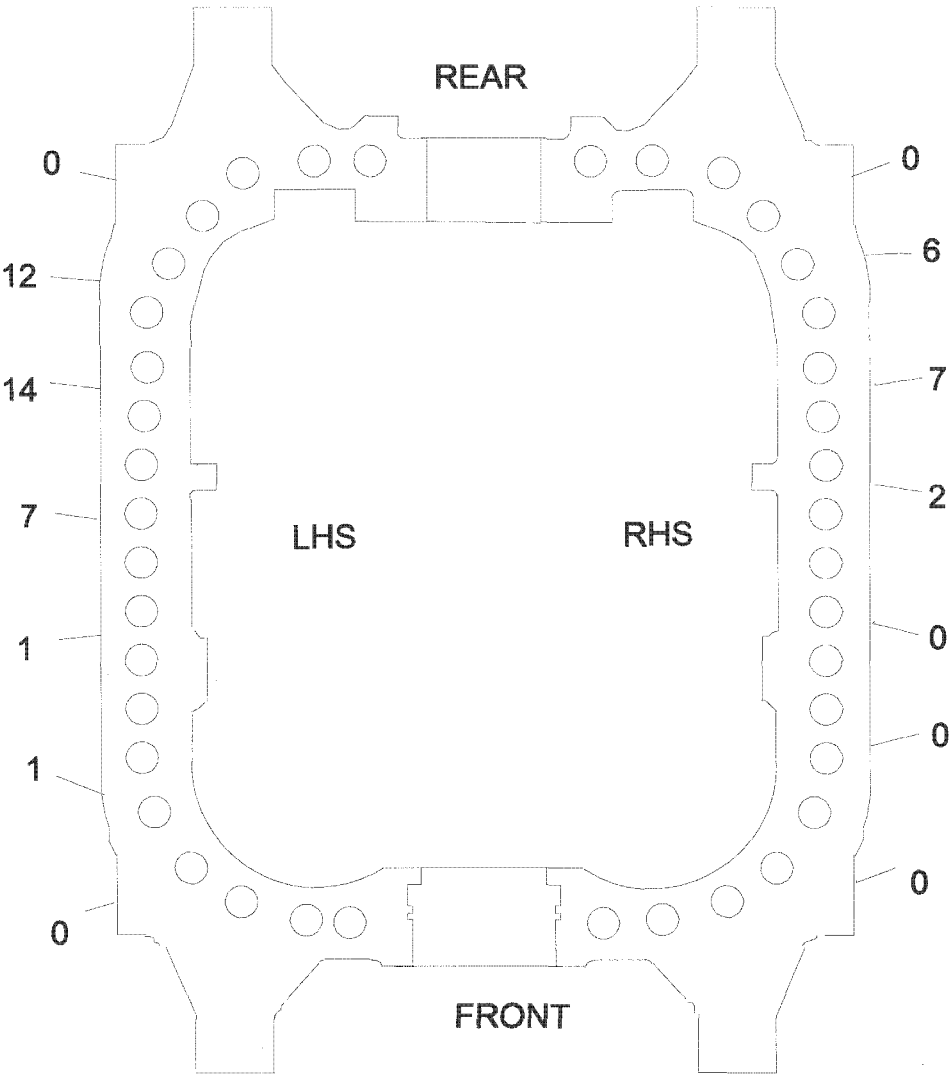
IP7008330

RECORD SHEET HP24/024

Page No. 6.26

Title		HP OUTER CYLINDER JOINT GAPS - UNBOLTED			
Contract	INTERMOUNTAIN	Unit No.	1	Serial No.	11246
Site Issue	A	Date	17/02/02	Checked	BI
Check List No.		1175			
Taken by	IPSC	Date	3/3/03	Supervisor	MLS
Approved		Date			

Readings are 0.001"



6 - HP REBUILD

RECORD SHEET HP27/015

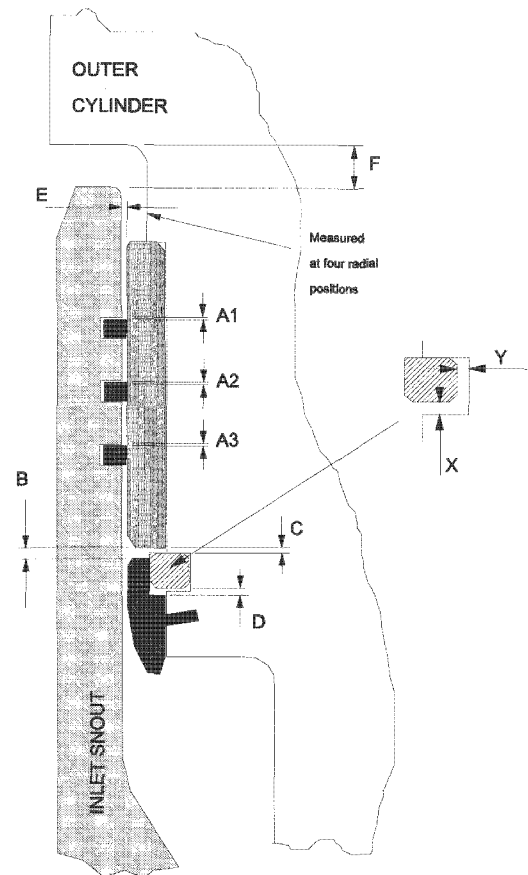
Page No. 6.27

Title **HP STEAM INLETS CLEARANCES**

Contract **INTERMOUNTAIN** Unit No. **1** Serial No. **11246**
 Site Issue **A** Date **13/3/02** Checked **BI** Check List No. **1175**
 Taken by **CFS** Date **16/3/03** Supervisor **M Storey** Date **16/3/03** Approved **Date**
 REF DRAWINGS :- R202/A0/5396 Rev. C, R202/A0/5387 Rev A

Readings in inches

		HP TURBINE INLETS			
POSITION	DESIGN	TOP LHS	TOP RHS	BOTT LHS	BOTT RHS
A1	.020/.027	.022	.020	.020	.021
A2	.020/.027	.021	.021	.020	.021
A3	.020/.027	.021	.021	.020	.021
B*	.035/.055	.048	.048	.039	.039
C*	.006/.016	.006	.006	.008	.009
D*	0.024/.040	.030	.030	.030	.030
X	0.004/.008	.006	.004	.005	.005
Y	0.008/.018	.012	.013	.011	.011
E L/R min.	.040 min.	.114	.118	.113	.113
E F/R min.	.080 min.	.098	.085	.096	.073
F*	.315/.472	Refer to HP/M16 & HP/M16A (p7.6-7)			
SEALING RING OVERLAP CLRC	DESIGN				
	RING 1	.421	.421	.421	.421
	RING 2	.421	.421	.421	.421
	RING 3	.421	.421	.421	.421



* Notes

- Clearances 'B', 'C' & 'D' to be confirmed after machining components to suit dimensions measured on Record Sheets HP/M6 and M6A (Section 7).
- Clearance 'F' derived from measurements on Record Sheets HP/M16 and M16A (Section 7)

6 - HP REBUILD

IP7008332

RECORD SHEET **HP27/019**

Page No. **6.28**

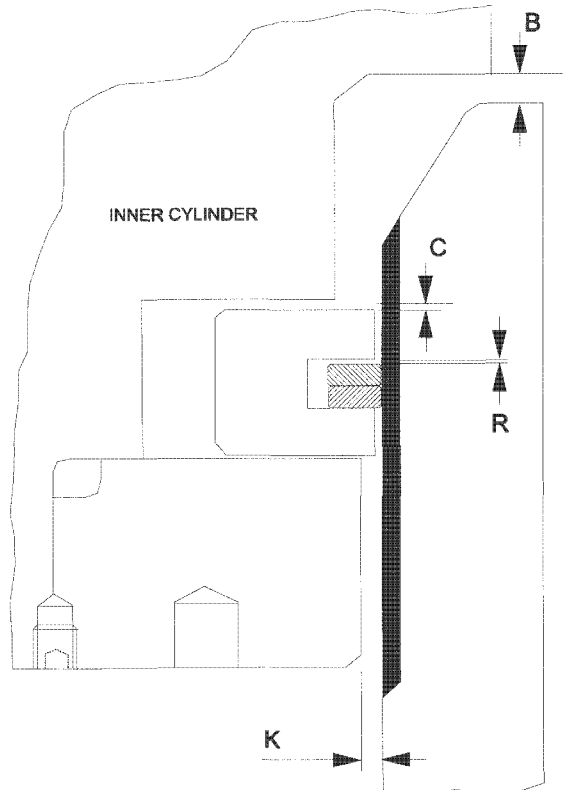
Title **HP HEATER CONNECTION ASSEMBLY**

Contract **INTERMOUNTAIN** Unit No. **1** Serial No. **11246**

Site Issue **A** Date **3/3/02** Checked **BI** Check List No. **1175**

Taken by **B Grierson** Date **16/3/03** Supervisor **BG** Date **16/3/03** Approved Date

REF DRAWING :- **R202/A1/5380 Rev A**



Readings in inches

	RADIAL		AXIAL		
	L	K	C	R	B
DESIGN	N/A	.040/.438	.016/.024	.016/.028	.217/.413
CARRIER L/R	---	.215 min	.020	.016	.315
CARRIER F/R	---	.224 min	.020	.016	.315

RING END CLRC	RING 1A	RING 1B	RING 2A	RING 2B
DES = .106/.118	Works assembled		N/A	N/A

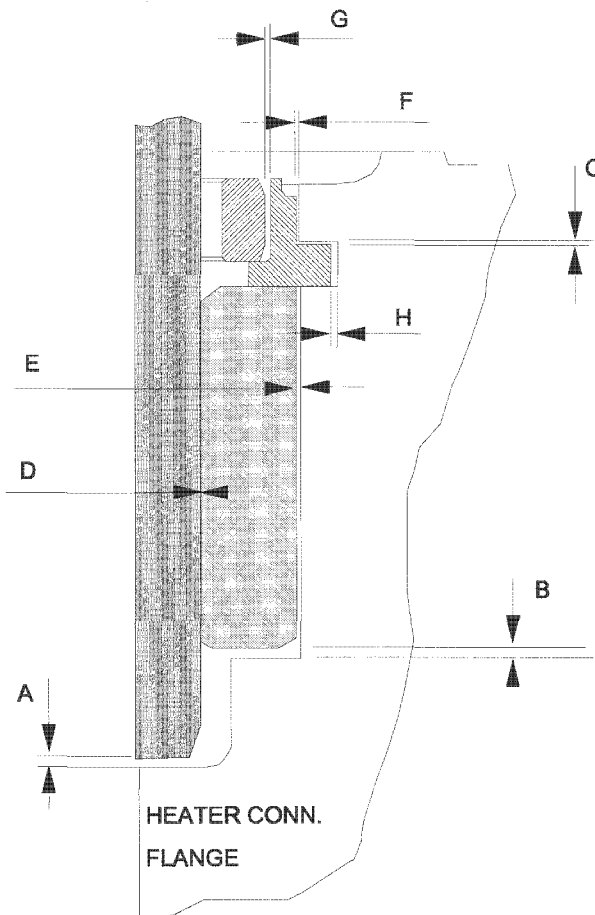
6 - HP REBUILD

IP7008333

Title **HP HEATER CONNECTION FLANGE CLEARANCES**

Contract	INTERMOUNTAIN		Unit No.	1	Serial No.	11246
Site Issue	A	Date	15/03/02	Checked	BI	Check List No. 1175
Taken by	CFS	Date	18/3/03	Supervisor	Date	Approved

REF DWG:- R202/AO/5396 REV C



Readings in inches

POSITION	A	B	C	D	E	F/G	H
DESIGN	.039/.079	.015/.025	.010/.015	-.001/-.003	.001/.003	.0004/.004	.008/.018
ACTUAL	.050	.020	.013	-.001/.002	.003	.004	.015

Final length of spool =

6 - HP REBUILD

IP7008334

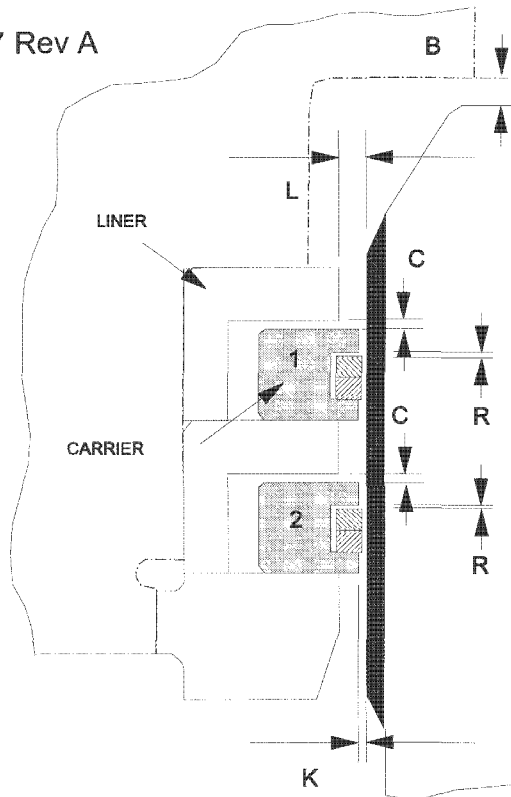
Title **HP LEAKOFF FOR IP ROTOR COOLING CONNECTION ASSEMBLY**

Contract **INTERMOUNTAIN** Unit No. **1** Serial No. **11246**

Site Issue **A** Date **3/3/02** Checked **BI** Check List No. **1175**

Taken by **BG** Date **16/3/03** Supervisor Date Approved Date

REF DRAWING :- R202/A0/5397 Rev A



Readings in inches

	RADIAL		AXIAL		
	L	K	C	R	B
DESIGN	.035/.279	0.020/.026	.024/.031	.017/.027	.472/.551
CARRIER 1	L/R .130 min F/R .278 min	NR	Works fitted components		.531
CARRIER 2	"	NR			

RING END CLRC	RING 1A	RING 1B	RING 2A	RING 2B
DES = 0.106/118	Works fitted components			

6 - HP REBUILD

IP7008335

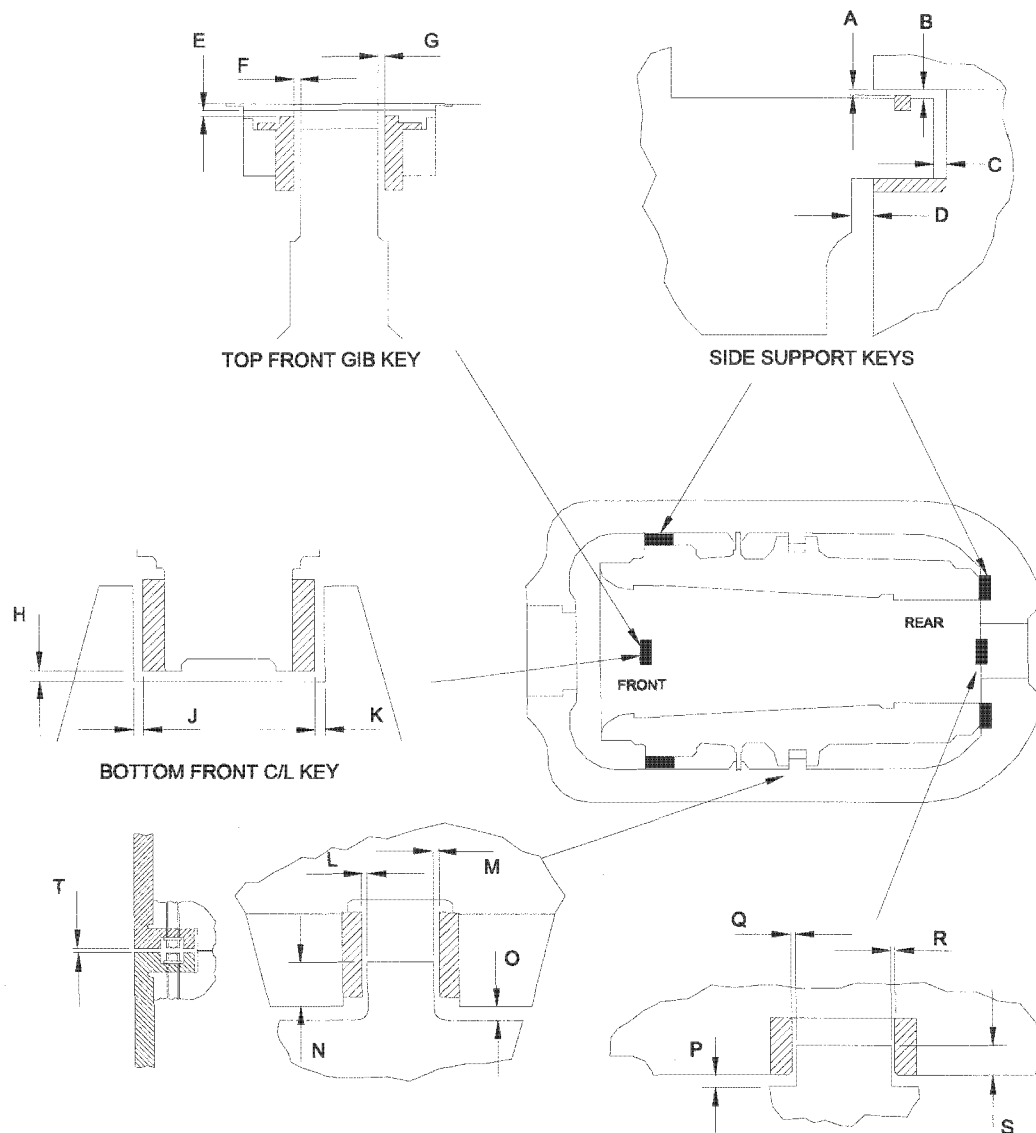
Title **HP INNER TO OUTER CYLINDER KEY CLEARANCES**

Contract **INTERMOUNTAIN** Unit No. **1** Serial No. **11246**

Site Issue **A** Date **17/02/02** Checked **BI** Check List No. **1175**

Taken by _____ Date _____ Supervisor _____ Date _____ Approved _____ Date _____

REF DWG:- R202/AO/5396 REV C



6 - HP REBUILD

IP7008336

Title **HP INNER TO OUTER CYLINDER KEY CLEARANCES**

Contract **INTERMOUNTAIN** Unit No. **1** Serial No. **11246**

Site Issue **A** Date **17/02/02** Checked **BI** Check List No. **1175**

Taken by Various Date March 03 Supervisor MLS/BG Date Mar 03 Approved Date

REF DWG:- R202/AO/5396 REV C

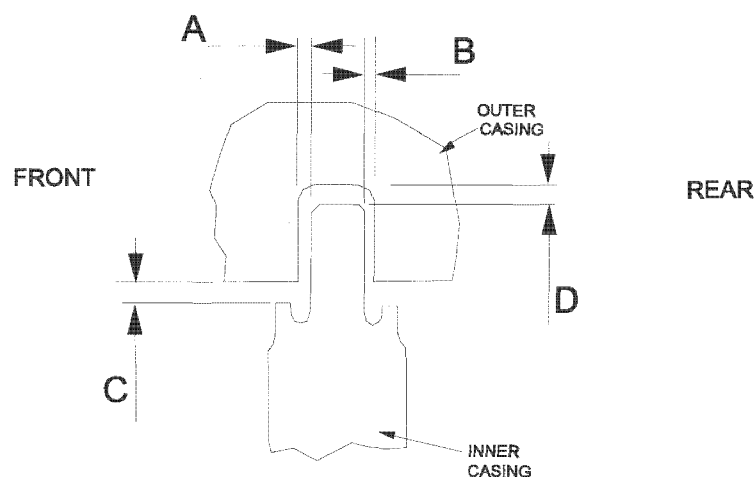
Readings in inches

SIDE SUPPORT KEYS									
	A		B		C		D		
	DESIGN	ACTUAL	DESIGN	ACTUAL	DESIGN	ACTUAL	DESIGN	ACTUAL	
FRONT LHS KEY	.006/.008	.008	.031 MIN	.056	.250/.590	.424	.490/ 1.100	.810	
FRONT RHS KEY		.008		.050		.480		.809	
REAR LHS KEY	.006/.008	.008	.031 MIN	.042	.250/.590	.629	.490/ 1.100	.984	
REAR RHS KEY		.006		.034		.552		1.009	
FRONT TRANSVERSE LOCATING KEYS									
TOP KEY	E		F + G		BOTTOM KEY		H		J + K
DESIGN	.010/.030		.004/.006		DESIGN		.250/.400		.004/.006
ACTUAL	0.025		0.004		ACTUAL		.375		.004
AXIAL LOCATING KEYS									
	L + M		O		N		T (Design= .004/.027)		
	DESIGN	ACTUAL	DESIGN	ACTUAL	DESIGN	ACTUAL	POSITION	ACTUAL	
LHS TOP	.004/.006	NR	.250/.420	NR	1.000 MIN	NR	LH Front	.024	
RHS TOP		NR		NR		NR	LH Rear	.027	
LHS BOT		.004		.804		2.5	RH Front	.030	
RHS BOT		.004		.764		2.5	RH Rear	.020	
REAR TRANSVERSE LOCATING KEYS									
	P		Q + R		S				
	DESIGN	ACTUAL	DESIGN	ACTUAL	DESIGN	ACTUAL			
TOP	0.250 MIN 0.400 MAX	NR	.004/.006	.006	1.000 MIN		1.5		
BOTTOM		NR		.004			1.5		

Title **HP INNER TO OUTER CYLINDER BAFFLE ASSEMBLY CLEARANCES**

Contract	INTERMOUNTAIN		Unit No.	1	Serial No.	11246
Site Issue	A	Date	19/3/02	Checked	BI	Check List No.
Taken by	B Grierson	Date	18/3/03	Supervisor	BG	Date
				Approved		Date

REF DWG :- R202(AO)5396 Sht 3 Rev C



INNER/OUTER CYLINDERS
IN FINAL AXIAL RELATIONSHIP

Readings in inches

POSITION	DESIGN	BOTTOM HALF BAFFLE		*TOP HALF BAFFLE	
		LHS	RHS	LHS	RHS
AXIAL - A	.039/.200	.125	.115	*	*
AXIAL - B	.039/.200	.128	.138	*	*
RADIAL - C	.160/.250	.129	.123	*	*
RADIAL - D	.200/.275	.213	.212	*	*

* No significant steps between top and bottom halves

6 - HP REBUILD

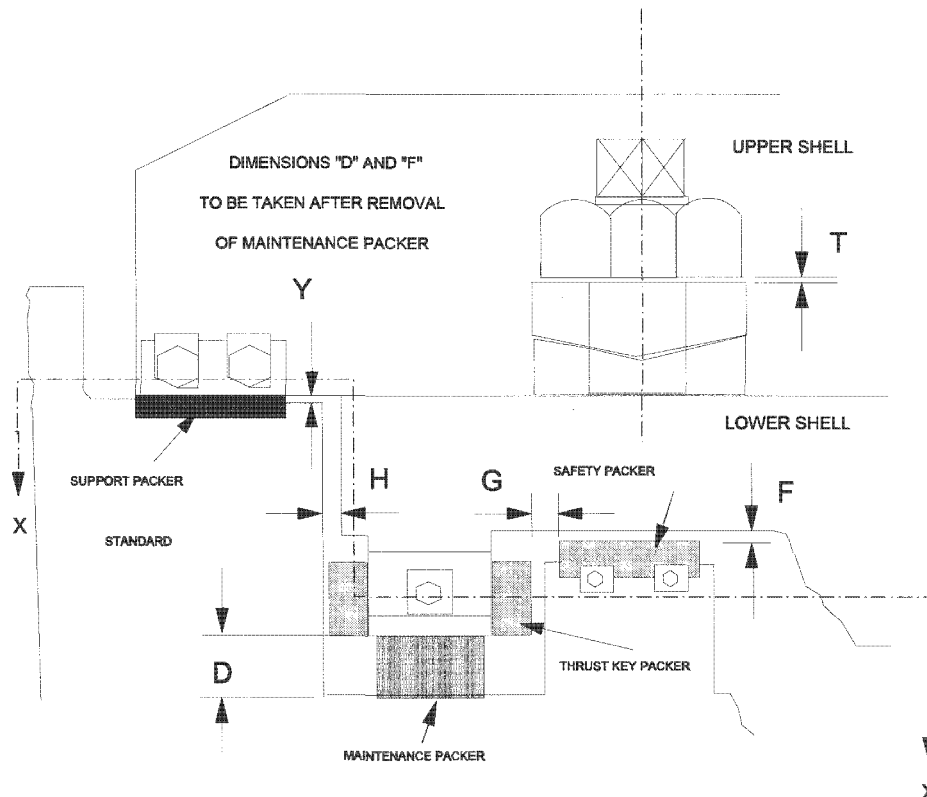
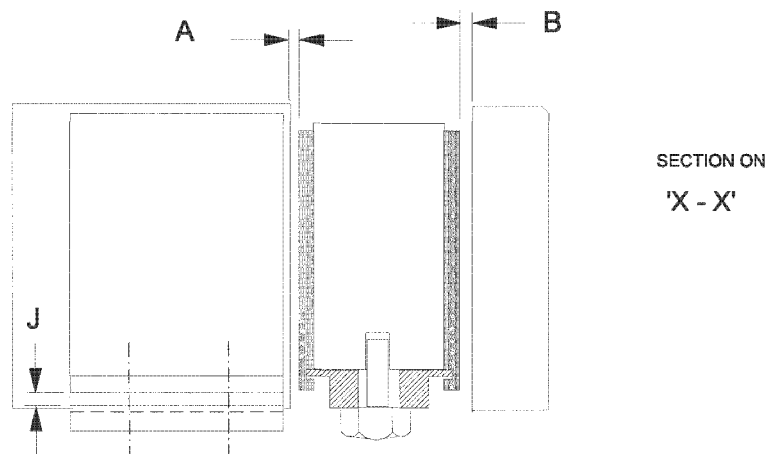
IP7008338

Title **HP CYLINDER THRUST KEY & PAW GRIP CLEARANCES**

Contract **INTERMOUNTAIN** Unit No. **1** Serial No. **11246**

Site Issue **A** Date **17/02/02** Checked **BI** Check List No. **1175**

Taken by _____ Date _____ Supervisor _____ Date _____ Approved _____ Date _____



6 - HP REBUILD

Title **HP CYLINDER THRUST KEY & PAW GRIP CLEARANCES**

Contract **INTERMOUNTAIN** Unit No. **1** Serial No. **11246**

Site Issue **A** Date **17/02/02** Checked **BI** Check List No. **1175**

Taken by **W Falconer** Date **26/3/03** Supervisor Date Approved Date

Readings in inches

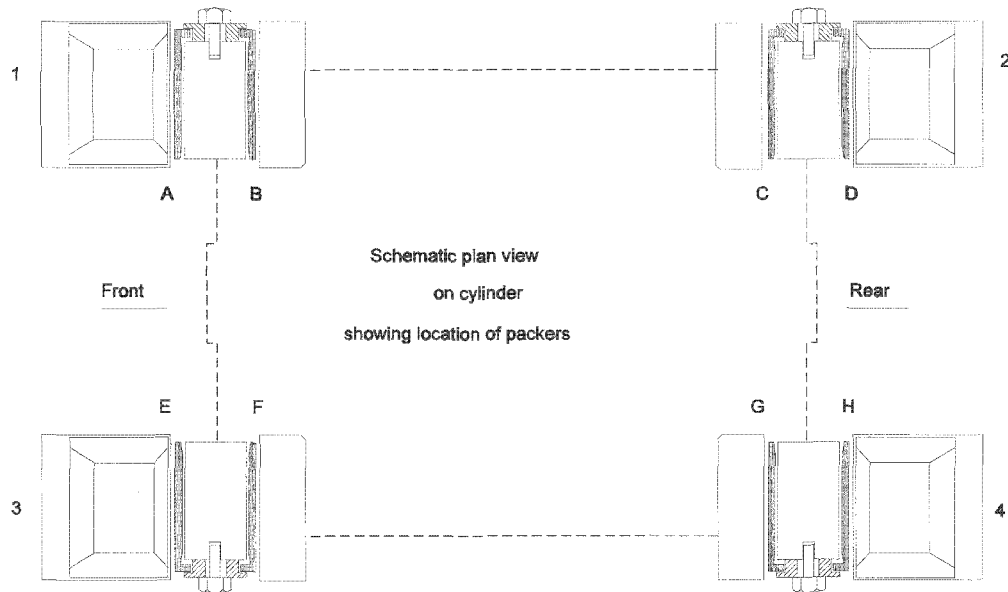
THRUST KEY PACKER CLEARANCE - "A+B" (TOTAL)			DESIGN =
CYLINDER LHS	LH FRONT KEY	LH REAR KEY	
	0.002	0.003	
CYLINDER RHS	RH FRONT KEY	RH REAR KEY	
	0.002	0.003	
TOP PALM TO STANDARD CLEARANCE 'J' =		SAFETY PACKER CLEARANCE	SAFETY PACKER TO LOWER PALM CLEARANCE 'F'
LH FRONT	NR	LH FRONT	0.063
LH REAR	NR	LH REAR	0.050
RH FRONT	NR	RH FRONT	0.062
RH REAR	NR	RH REAR	0.050
MAINTENANCE PACKER GAP - 'D'		PALM TO STANDARD GAP - 'Y'	
LH FRONT KEY	LH REAR KEY	LH FRONT KEY	LH REAR KEY
1.015	1.043	0.293	0.323
RH FRONT KEY	RH REAR KEY	RH FRONT KEY	RH REAR KEY
1.027	1.054	0.295	0.220
BOTTOM PALM TO STANDARD CLEARANCE - 'H'			
LH FRONT KEY	0.572	LH REAR KEY	0.478
RH FRONT KEY	0.590	RH REAR KEY	0.464
SAFETY PACKER TO THRUST KEY PACKER CLEARANCE - 'G'			
LH FRONT	0.352	LH REAR	0.070
RH FRONT	0.018	RH REAR	0.228
RETAINING BOLT CLEARANCE - 'T'			
LH FRONT		LH REAR	
RH FRONT		RH REAR	

Title **HP CYLINDER THRUST KEY & SUPPORT PACKER THICKNESSES**

Contract **INTERMOUNTAIN** Unit No. **1** Serial No. **11246**

Site Issue **A** Date **17/02/02** Checked **BI** Check List No. **1175**

Taken by _____ Date _____ Supervisor _____ Date _____ Approved _____ Date _____



Readings in inches

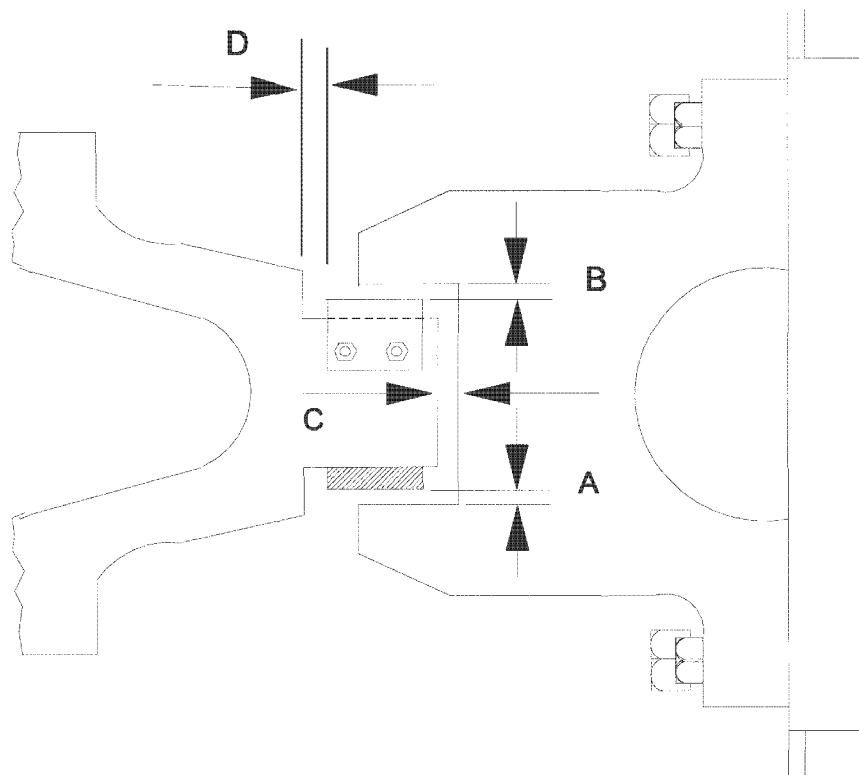
THRUST KEY PACKER THICKNESSES	A	B	C	D
	As stripdown	As stripdown	1.100	0.642
	E	F	G	H
	As stripdown	As stripdown	1.131	0.632
CYLINDER PAW KEY WIDTH	LH FRONT	As stripdown	LH REAR	As stripdown
	RH FRONT	As stripdown	RH REAR	As stripdown
PEDESTAL KEYWAY WIDTH	LH FRONT	As stripdown	LH REAR	As stripdown
	RH FRONT	As stripdown	RH REAR	As stripdown
SUPPORT PACKER THICKNESS	LH FRONT	LH REAR	RH FRONT	RH REAR
	1.044	1.072	1.042	1.076
TEMPORARY SUPPORT PACKER THICKNESS	LH FRONT	As stripdown	LH REAR	As stripdown
	RH FRONT	As stripdown	RH REAR	As stripdown

Title **HP CYLINDER TO PEDESTAL CENTRE LINE KEY CLEARANCES**

Contract **INTERMOUNTAIN** Unit No. **1** Serial No. **11246**

Site Issue **A** Date **17/02/02** Checked **BI** Check List No. **1175**

Taken by _____ Date _____ Supervisor _____ Date _____ Approved _____ Date _____



PLAN VIEW ON TYPICAL KEY ASSEMBLY

Readings in inches

CYLINDER POSITION	KEY POSITION	(A + B)		C		D	
		DESIGN	ACTUAL	DESIGN	ACTUAL	DESIGN	ACTUAL
FRONT	TOP						
	BOTTOM						
REAR	TOP						
	BOTTOM						

6 - HP REBUILD

IP7008342

Title **HP CYLINDER COMPONENT BOLTS - TORQUE SETTINGS**

Contract **INTERMOUNTAIN** Unit No. **1** Serial No. **11246**

Site Issue **A** Date **17/02/02** Checked **BI** Check List No. **1175**

Taken by _____ Date _____ Supervisor _____ Date _____ Approved _____ Date _____

Drawing Ref. R212/A0/3856 Rev A, R265/A0/9371 Rev A, R265/A0/9372 - 9378 Rev B

LOCATION	ITEM NO.	QTY.	SIZE	DESIGN		ACTUAL
				Ft.Lb.	Nm	
HP INLET GLAND	3	4	2¼"-8UN -2A	3584	4859	
"	4	6	2"-8UN -2A	2580	3499	
"	5	6	1¼"-8UN -2A	608	824	
"	9	2	1"-8UN -2A	216	293	
STAGE 1 DIAPHRAGM	12	2	⅝"-11UN -2A	51	70	
STAGE 2 DIAPHRAGM	12	2	1⅜"-8UN -2A	583	791	
"	13	2	1"-8UN -2A	216	293	
STAGE 3 DIAPHRAGM	12	2	1⅜"-8un -2A	583	791	
"	13	2	1"-8UN -2A	216	293	
STAGE 4 DIAPHRAGM	12	2	1⅜"-8UN -2A	313	424	
"	13	2	1" 8UN -2A	216	293	
STAGE 5 DIAPHRAGM	12	2	1⅜"-8UN -2A	313	424	
"	13	2	1" 8UN -2A	216	293	
STAGE 6 DIAPHRAGM	12	2	1⅜"-8UN -2A	313	424	
"	13	2	1" 8UN -2A	216	293	
STAGE 7 DIAPHRAGM	12	2	1⅜"-8UN -2A	313	424	
"	13	2	1" 8UN -2A	216	293	
STAGE 7 DIAPHRAGM	12	2	1⅜"-8UN -2A	313	424	
"	13	2	1" 8UN -2A	216	293	

Title **CONTROLLED TIGHTENING OF HP INNER CYLINDER BOLTS**

Contract **INTERMOUNTAIN** Unit No. **1** Serial No. **11246**

Site Issue **A** Date **17/02/02** Checked **BI** Check List No. **1175**

Taken W Gasser Date 21/3/03 Supervisor M Storey Date 21/3/03 Approved Date

JOINT BEING TIGHTENED : **HP INNER CYLINDER HALF JOINT**

DRAWING REFERENCE : **R200/A3/10344**

METHOD OF TIGHTENING : **HEATING**

REAR (GENERATOR END)

Readings in inches

LHS FLANGE JOINT

RHS FLANGE JOINT

BOLT No.	MEASUREMENT		EXTENSION		BOLT No.	MEASUREMENT		EXTENSION	
	BEFORE	AFTER	ACTUAL	DESIGN		BEFORE	AFTER	ACTUAL	DESIGN
11	.714	.739	0.025	.025/.031	12	.727	.752	0.025	.025/.031
23	.536	.580	0.044	.037/.045	24	.528	.573	0.045	.037/.045
7	.547	.592	0.045	.037/.045	8	.571	.612	0.041	.037/.045
19	.541	.583	0.042	.037/.045	20	.541	.579	0.038	.037/.045
3	.533	.571	0.038	.037/.045	4	.549	.588	0.039	.037/.045
15	.538	.579	0.041	.037/.045	16	.530	.571	0.041	.037/.045
1	.718	.749	0.031	.025/.031	2	.718	.749	0.031	.025/.031
17	.545	.578	0.033	.029/.035	18	.547	.578	0.031	.028/.035
5	.548	.580	0.032	.029/.035	6	.548	.578	0.030	.028/.035
21	.547	.576	0.029	.029/.035	22	.523	.556	0.033	.028/.035
27	.428	.459	0.031	.025/.031	28	.422	.453	0.031	.025/.031
9	.429	.461	0.032	.025/.031	10	.415	.446	0.031	.025/.031
25	.430	.460	0.030	.025/.031	26	.428	.453	0.025	.025/.031
13	.431	.458	0.027	.025/.031	14	.429	.460	0.031	.025/.031

FRONT (TURBINE) END

THE IDENTIFICATION NUMBERS ARE MARKED ON THE STUDS AND NUTS

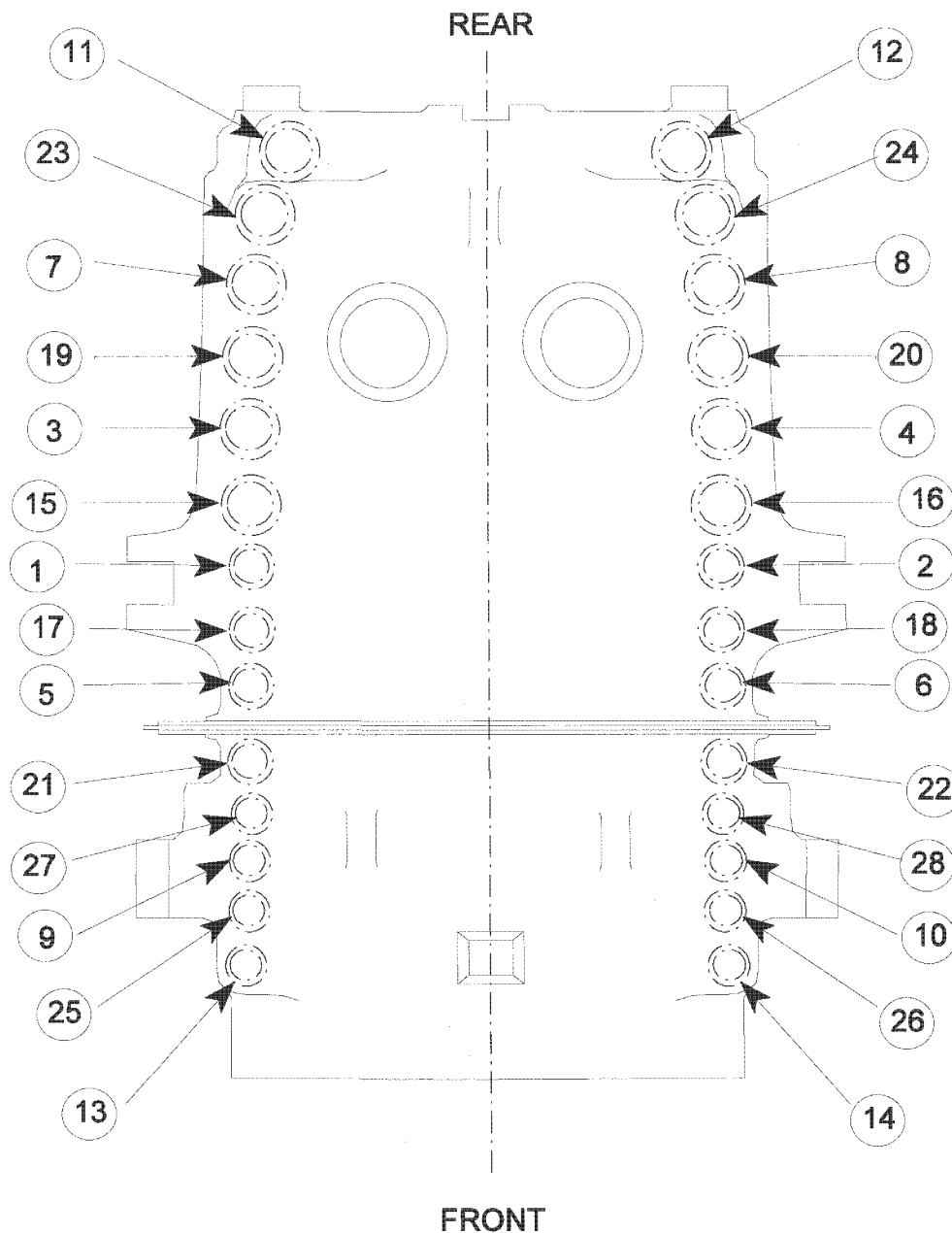
IT IS ESSENTIAL THAT THE STUDS ARE CHECKED AND RE-TIGHTENED PROGRESSIVELY.

6 - HP REBUILD

IP7008344

Title **TIGHTENING SEQUENCE FOR HP INNER CYLINDER BOLTS**

Contract	INTERMOUNTAIN		Unit No.	1	Serial No.	11246
Site Issue	A	Date	17/02/02	Checked	BI	Check List No. 1175
Taken by	Date	Supervisor	Date	Approved	Date	



6 - HP REBUILD

Title HP OUTER SHELL DISTORTION MEASUREMENTS - LASER

Contract INTERMOUNTAIN Unit No. 1 Serial No. 11246
 Site Issue A Date 5/3/03 Checked WHF Check List No. 1175
 Taken by M Morris LMS Date 12/3/03 Supervisor Date Approved Date

Readings referenced to outer cylinder (gland locations A2 and E2)

Note: For horizontal positive no. = Right For vertical positive no. = Up

Readings in inches

POSITION OF GLAND	HORIZONTAL TOPS OFF	HORIZONTAL TOPS ON	HORIZONTAL SHIFT	VERTICAL TOPS OFF	VERTICAL TOPS ON	VERTICAL SHIFT
T1 bore	0.023	0.024	0.002	0.012	0.009	-0.004
A1	0.003	0.004	0.001	0.006	0.004	-0.003
A2	0	0	0	0	0	0
B1	0.002	0.004	0.002	0.012	0.004	-0.008
B2/3	0.002	0	-0.002	0.018	0.004	-0.014
B5	0.002	-0.001	-0.003	0.026	0.008	-0.018
St 8	-0.006	-0.002	0.005	-0.004	-0.020	-0.016
St 2	-0.004	-0.003	0.001	-0.003	-0.016	-0.013
C1	0.002	0.002	0.001	-0.005	-0.017	-0.012
C7	0.002	0.001	-0.001	-0.006	-0.016	-0.010
D1	0	0	0	0.001	0	-0.001
D2/D3	-0.002	0.002	0	0.006	0.005	-0.001
D4	-0.002	-0.002	0	0.011	0.008	-0.003
E2	0	0	0	0	0	0
T2 bore	0.005	0.004	0	-0.016	-0.034	-0.018

Title **HP OUTER SHELL DISTORTION MEASUREMENTS - LASER**

Contract **INTERMOUNTAIN** Unit No. **1** Serial No. **11246**
 Site Issue **A** Date **5/3/03** Checked **WHF** Check List No. **1175**
 Taken by M Morris LMS Date 12/3/03 Supervisor Date Approved Date

Readings referenced to the T1 -T2 rotor bearings boreline

horizontal positive no. = Right For vertical positive no. = Up

Readings in inches

POSITION OF GLAND	HORIZONTAL TOPS OFF	HORIZONTAL TOPS ON	HORIZONTAL SHIFT	VERTICAL TOPS OFF	VERTICAL TOPS ON	VERTICAL SHIFT
T1 bore	0	0	0	0	0	0
A1	-0.020	-0.020	-0.001	-0.005	-0.004	0.002
A2	-0.022	-0.023	-0.002	-0.011	-0.006	0.005
B1	-0.020	-0.019	0	0.002	-0.002	-0.003
B2/3	-0.018	-0.022	-0.004	0.009	0.001	-0.008
B5	-0.018	-0.022	-0.004	0.020	0.008	-0.012
St 8	-0.024	-0.021	0.003	-0.009	-0.017	-0.008
St 2	-0.016	-0.016	0.001	0.001	0	-0.001
C1	-0.009	-0.009	0	0.002	0.003	0.001
C7	-0.007	-0.008	-0.001	0.005	0.010	0.005
D1	-0.008	-0.009	0	0.012	0.026	0.014
D2/D3	-0.010	-0.010	0	0.018	0.033	0.015
D4	-0.009	-0.009	0	0.024	0.037	0.013
E2	-0.006	-0.006	0	0.015	0.032	0.017
T2 bore	0	0	0	0	0	0

Title **HP OUTER SHELL DISTORTION MEASUREMENTS - LASER**

Contract **INTERMOUNTAIN** Unit No. ☐ Serial No. **11246**

Site Issue **A** Date **26/03/02** Checked **BI** Check List No. **1175**

Taken by M Morris LMS Date 12/3/03 Supervisor Date Approved Date

HP final alignment corrections for tops on condition

Note: For horizontal positive no. = Right For vertical positive no. = Up

Readings in inches

GLAND POSITION	IDEAL HORIZONTAL	IDEAL VERTICAL (excl'd'g ovality)	CORRECTED HORIZONTAL	CORRECTED VERTICAL	HORIZONTAL CORRECTION	ELEVATION CORRECTION
A2	0	0	0	0	0	0
B1	0	-0.001	0.004	0.004	-0.004	-0.005
B2/3	0	-0.002	0	0.004	0	-0.006
B5	0	-0.003	-0.001	0.008	0.001	-0.011
St 8	0	-0.005	-0.002	-0.020	0.002	0.015
St 2	0	-0.006	-0.003	-0.016	0.003	0.010
C1	0	-0.005	0.002	-0.017	-0.002	0.012
C7	0	-0.003	0.001	-0.016	-0.001	0.013
D1	0	-0.002	0	0	0	-0.002
D2/D3	0	-0.001	-0.002	0.005	0.002	-0.006
D4	0	0	-0.002	0.008	0.002	-0.008
E2	0	0	0	0	0	0

abcd

RECORD SHEET HP18/001

Page No. 6.44

Title **HP CYLINDER FINAL BOX-UP CHECKS - INNER CYLINDER**Contract **INTERMOUNTAIN** Unit No. **1** Serial No. **11246**Site Issue **A** Date **17/02/02** Checked **BI** Check List No. **1175**

Taken by _____ Date _____ Supervisor _____ Date _____ Approved _____ Date _____

THE FOLLOWING CHECKS ARE TO BE COMPLETED PRIOR TO FITTING THE TOP HALF
INNER CYLINDER COVER

CHECK		INSPECTED BY (SIGNATURE)	
		ALSTOM	IPSC
1	ALL RELEVANT CHECKSHEETS COMPLETED AND APPROVED	W Falconer	
2	ROTOR UNBOXED BUMP CHECK COMPLETED	M.L. Storey	
3	ALL HORIZONTAL JOINTS CLEAN AND BURR FREE	B Grierson	
4	ALL GLAND ALIGNMENT KEYS AND DOWELS CORRECTLY FITTED	B Grierson	
5	ALL INTERNAL FITTINGS, PIPES, CLAMPS ETC FITTED	B Grierson	
6	ALL INSTRUMENTATION/CABLING FITTED WHERE APPLICABLE	N/A	
7	ALL FASTENERS LOCKED OFF TO THE REQUIRED STANDARD	B Grierson	
8	TV INSPECTION SATISFACTORILY COMPLETED	B Grierson	
9	ALL TEMPORARY ARRANGEMENTS USED TO PROTECT OPENINGS REMOVED	B Grierson	
10	WHERE CYLINDERS ARE TOP HALF SUPPORTED ENSURE THAT THE TEMPORARY SUPPORTS FOR THE BOTTOM HALF INNER CYLINDER ARE REMOVED	N/A	
11	ALL INTERNALS THOROUGHLY CLEAN	B Grierson	
12	CYLINDER BOXED-UP DATE	19 March '02	

6 - HP REBUILD

IP7008349

Title **HP CYLINDER FINAL BOX-UP CHECKS - OUTER CYLINDER**

Contract **INTERMOUNTAIN** Unit No. **1** Serial No. **11246**

Site Issue **A** Date **17/02/02** Checked **BI** Check List No. **1175**

Taken by _____ Date _____ Supervisor _____ Date _____ Approved _____ Date _____

THE FOLLOWING CHECKS ARE TO BE COMPLETED PRIOR TO FITTING THE TOP HALF
OUTER CYLINDER COVER

CHECK		INSPECTED BY (SIGNATURE)	
		ALSTOM	IPSC
1	ALL RELEVANT CHECKSHEETS COMPLETED AND APPROVED	W Falconer	
2	ROTOR UNBOXED BUMP CHECK COMPLETED	B Grierson	
3	ALL HORIZONTAL JOINTS CLEAN AND BURR FREE	B Grierson	
4	ALL GLAND ALIGNMENT KEYS AND DOWELS CORRECTLY FITTED	B Grierson	
5	ALL INTERNAL FITTINGS, PIPES, CLAMPS ETC FITTED	B Grierson	
6	ALL INSTRUMENTATION/CABLING FITTED WHERE APPLICABLE	W Falconer	
7	ALL FASTENERS LOCKED OFF TO THE REQUIRED STANDARD	B Grierson	
8	TV INSPECTION SATISFACTORILY COMPLETED	B Grierson	
9	ALL TEMPORARY ARRANGEMENTS USED TO PROTECT OPENINGS REMOVED	B Grierson	
10	WHERE CYLINDERS ARE TOP HALF SUPPORTED ENSURE THAT THE TEMPORARY SUPPORTS FOR THE BOTTOM HALF INNER CYLINDER ARE REMOVED	B Grierson	
11	ALL INTERNALS THOROUGHLY CLEAN	B Grierson	
12	CYLINDER BOXED-UP DATE	22 March 2002	

UNAPPROVED

UNAPPROVED

6 - HP REBUILD

IP7008351

From: <bill.eisma@power.alstom.com>
To: <phong-d@ipsc.com>
Date: 6/17/2003 1:29:40 PM
Subject: Delta 1. Customer Satisfaction

Phong,

I send the attached form with a letter dated May 2, 2003. This might have got lost somehow somewhere, I would therefore appreciate if you could take a couple of minutes to complete the attached and return it so we can enter your opinions into our data base.

Thanks,

Bill

(See attached file: Cust.Sat.Survey (after PAC).xls)

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IP7008352

From: <kevin.spires@power.alstom.com>
To: "Phong Do" <PHONG-D@ipsc.com>
Date: 2/13/03 9:43AM
Subject: Delta unit 1. US Vendors info.

Phong

details of the other guys.

I'll have to try and get approx dates off Wally.

Regards

Kevin

Laser Measurement Services Inc, 301 Montreal Street, Playa Del Ray, CA
90293
Mr. Martin J. Morris, Tel,: (310) 822-585, Fax: (310) 822-9394, E-mail:
mmlms@attbi.com

FARO Arm Rental.
Edison ESI, 7300 Fenwick Lane, Westminster, CA 92683

Mr. Marco Parize, Tel.: (714) 895-0151, Fax: (714) 895-0298, E-mail:
Marco.Parize@sce.com

New E-Control Cards Supply + Installation
NovaTech., 328 South Link Lane Ste. 13, Fort Collins. CO 80524
Mr. Joe Hovorka, Tel.: (970) 224-2223, Fax: (970) 224-1700, E-mail:
novatech@novatechcorp.net

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IP7008353



CERTIFICATE OF PLACING EQUIPMENT INTO SERVICE

Purchaser : Intermountain Power Service Corporation

Equipment: HP Steam Path Components for Delta unit 1 HP Retrofit.

Contract # : 01-45510 dated April 9, 2001.

The parties concerned in the above mentioned Contract hereby agree that the Equipment supplied by ALSTOM Power Inc. completed installation on 3/28/03, all Technical Field Assistance Services were rendered and all tests associated with the Installation were completed.

The unit was available for Turning Gear Operation on 3/28/03 and initial electrical synchronization occurred on 3/29/03.

Thereby, the full responsibility for operation, maintenance and insurance has been transferred to the Purchaser/Owner and the Equipment Warranty period per Article 1 - Warranty, in Part C - Division C2 page C2-1 of the above referenced Contract has started.

The Warranty Period for the HP Steam Path Equipment, referenced in the Warranty section of the Contract, will expire at the end of the following periods, whichever shall expire first;

24 Month from initial electrical synchronization which occurred on 3/29/03 at 23.00Hrs

36 Month from delivery of the Equipment which occurred on 2/11/03

In no event shall the warranty period, including extensions thereto applicable to any component of the Work, extend for more than 54 month from the delivery date or 48 month from initial synchronization date shown above, whichever period shall expire first

Date:

Date: 5/02/03

For and on behalf of:
Intermountain Power Service Corporation.

For and on behalf of
ALSTOM Power Inc.

Name George W. Cross

Name : Wim F. (Bill) Eisma

Position President & Chief Operations Officer

Position : Director Retrofit Projects

Signature : _____

Signature : _____

ALSTOM Power Inc.
2800 Waterford Lake Drive
Midlothian, VA 23112

takocer.xls

IP7008354

From: <kevin.spires@power.alstom.com>
To: "Phong Do" <PHONG-D@ipsc.com>
Date: 2/13/03 9:02AM
Subject: Re: Security Info

Phong - Mike Jones will be there to measure IP.

Bill - Can you provide names / dates of novatech, laser & Faro guys please?

Kevin

----- Forwarded by Kevin SPIRES/GBRUG01/Power/ALSTOM on
13/02/2003 15:50 -----

Wally FALCONER
13/02/2003 15:15

To: Kevin SPIRES/GBRUG01/Power/ALSTOM@GA
cc:

Subject: Re: Security Info (Document link: Kevin SPIRES)

Kevin

Rugby personnel attending site

Wally Falconer	Technical Service Engr	expected arrival at
site	24th February 2003	
Ray McLoughlin	Service Engineer	28th February
2003		
Mike Storey	Service Engineer	28th February
2003		
Mike Jones	Design Engineer	7th March 2003
Mike Knibb	Test Engineer	1st April
2003		

Wally

Kevin SPIRES
13/02/2003 14:04

To: Wally FALCONER/GBRUG01/Power/ALSTOM, Dave
MURPHY/GBRUG01/Power/ALSTOM@GA
cc:

Subject: Security Info

Please note this.

IP7008355

Do we know who is going with Wally yet?

Kevin

----- Forwarded by Kevin SPIRES/GBRUG01/Power/ALSTOM on
13/02/2003 14:01 -----

"Phong Do" <PHONG-D@ipsc.com> on 13/02/2003 14:00:34

To: Bill Eisma/USRIC02/Power/ALSTOM@GA, Kevin
SPIRES/GBRUG01/Power/ALSTOM@GA
cc: Wally FALCONER/GBRUG01/Power/ALSTOM@GA

Subject: Security Info

Dear Bill/Kevin,

I need, ASAP, all people names, company names and estimated date of arrival of all contrators/subcontractors (ie from Alstom, Laser Measurement, Faro Arm, Nova Tech...) that Alstom will use for this U1 HP retrofit. Please see note below from our company vice president. Thanks.

"As of today (2/12/03) there has only been three "contractor information" turned into Security. I need to have each of you contract administrators make sure you give Security the information they need about your contractor as soon as possible. They need this info before the Unit One Outage starts. Thank you for your help."

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IP7008356

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CC: <bill.eisma@power.alstom.com>

IP7008357

Name	Address	Size
Mike Ally	98 North 100 East Hinckley UT 84635	XL
Will Lovell	6260 N 2000 W Delta UT 84624	XL
Brad Thompson	220 W 100 N Delta UT 84624	XXL
Kelly Cloward	518 E 280 N Delta UT 84624	XL
Dave Spence	35 E 175 N Oak City UT 84649	XL
Rick Houston		
Craig Teeple	260 W 300 S Fillmore UT 84631	XL
Neal Abbott	3755 W 2500 N Delta UT 84624	XXL
Steve Anzures	3470 W 4500 S Oasis UT 84650	XL
Randy Fields	59 W 300 N Hinckley UT 84635	XL
Mike Gould	1316 N 325 E Nephi UT 84648	XL
Shaun Harris	P.O. Box 684 Delta UT 84624	XL
Neno Hoelzle	1475 W Ashby Rd Delta UT 84624	XL
Phil Jensen	4275 N 3000 W Delta UT 84624	XL
Russ Mangelson	880 E 400 N Nephi UT 84648	XXL
Doyce Olpin	1401 N 550 E Nephi UT 84648	XL
Kelly Oppenheimer	2015 N 3000 W Delta UT 84624	L
Randy Riding	496 W 200 N Hinckley UT 84635	XXL
Rick Wagstaff	P.O. Box 354 Delta UT 84624	XL
Tony Wright	370 S 350 W Delta UT 84624	XXL
Mike Anderson	100 W 50 N Oak City UT 84649	XL
Clarke Christensen	245 N 100 W Oak City UT 84649	XL
Corry Carrol	456 S 320 W Delta UT 84624	L
Ken Crafts	P.O. Box 1111 Delta UT 84624	XL
Preston Eliason	4400 W 4500 S Hinckley UT 84635	L
Wayne Gasser	5053 W 2500 N Delta UT 84624	XXL
Paul McCollum	7170 W 2500 N Abraham UT 84635	XL
Dan Pack	P.O. Box 38097 Leamington UT 84638	XL
Stewart Rowley	P.O. Box 2 Oak City UT 84649	XXL
Dean Smith	1546 W 1500 S Delta UT 84624	XXL
Wayne Spencer	1095 W Ashby Rd Delta UT 84624	XL
Elven Stokes	P.O. Box 38071 Leamington UT 84638	XXL
Bob Terry	6405 N 3000 W Delta UT 84624	XXXL
James Nelson		L
Phong Do		M
Craig Jones		XL
Jon Christenson		L
Garry Judskin		L

CERTIFICATE OF EQUIPMENT DELIVERY
Purchaser : Intermountain Power Service Corporation

Equipment: HP Steam Path Components for Delta unit 1 HP Retrofit.

Contract # : 01-45510 dated April 9, 2001.

The parties concerned in the above mentioned Contract hereby agree that the Equipment supplied by ALSTOM Power Inc. completed installation on 3/28/03, all Technical Field Assistance Services were rendered and all tests associated with the Installation were completed. The unit was available for Turning Gear Operation on 3/28/03 and initial electrical synchronization occurred on 3/29/03.

Thereby, the full responsibility for operation, maintenance and insurance has been transferred to the Purchaser/Owner and the Equipment Warranty period per Article 1 - Warranty, in Part C - Division C2 page C2-1 of the above referenced Contract has started.

The Warranty Period for the HP Steam Path Equipment, referenced in the Warranty section of the Contract, will expire at the end of the following periods, whichever shall expire first;

24 Month from initial electrical synchronization which occurred on 3/29/03 at 23.00Hrs

36 Month from delivery of the Equipment which occurred on 2/11/03

In no event shall the warranty period, including extensions thereto applicable to any component of the Work, extend for more than 54 month from the delivery date or 48 month from initial synchronization date shown above, whichever period shall expire first

Date:

Date: 5/02/03

For and on behalf of:
Intermountain Power Service Corporation.

For and on behalf of
ALSTOM Power Inc.

Name George W. Cross

Name : Wim F. (Bill) Eisma

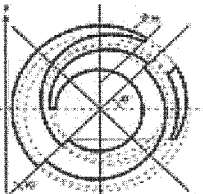
Position President & Chief Operations Officer

Position : Director Retrofit Projects

Signature : 

Signature :

IP7008359



TSR Project Name: Delta 1 HP

2nd Questionnaire from Febr. 2003 to April 2003

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After PAC

Poor		Mediocre		Adequate		Good		Excellent	
1	2	3	4	5	6	7	8	9	10

- 1 ● How do you rate ALSTOM's project execution?

									x
--	--	--	--	--	--	--	--	--	---
- 2 ● How do you rate ALSTOM's site performance?

								x	
--	--	--	--	--	--	--	--	---	--
- 3 ● Are you satisfied with ALSTOM's documentation and O&M Manual?

					x				
--	--	--	--	--	---	--	--	--	--
- 4 ● Does ALSTOM meet the time schedule regarding delivery dates and site activities?

--	--	--	--	--	--	--	--	--	--
- 5 ● Are you satisfied with the Quality of the equipment?

							8		
--	--	--	--	--	--	--	---	--	--
- 6 ● Are punch-list items completed expeditiously ?

								9	
--	--	--	--	--	--	--	--	---	--
- 7 ● Are you satisfied with ALSTOM's training on site?

						7			
--	--	--	--	--	--	---	--	--	--
- 8 ● Does the unit perform according contractual requirements ?

							8		
--	--	--	--	--	--	--	---	--	--
- 9 ● Are you satisfied with ALSTOM's products and services?

								9	
--	--	--	--	--	--	--	--	---	--
- 10 ● Are you satisfied with ALSTOM's after sales service?

								9	
--	--	--	--	--	--	--	--	---	--

Please put "x" into the range which reflects your rating most.

IP7008360

CERTIFICATE OF PLACING EQUIPMENT INTO SERVICE

Purchaser : Intermountain Power Service Corporation

Equipment: HP Steam Path Components for Delta unit 1 HP Retrofit.

Contract # : 01-45510 dated April 9, 2001.

The parties concerned in the above mentioned Contract hereby agree that the Equipment supplied by ALSTOM Power Inc. completed installation on 3/28/03, all Technical Field Assistance Services were rendered and all tests associated with the Installation were completed. The unit was available for Turning Gear Operation on 3/28/03 and initial electrical synchronization occurred on 3/29/03.

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In no event shall the warranty period, including extensions thereto applicable to any component of the Work, extend for more than 54 month from the delivery date or 48 month from initial synchronization date shown above, whichever period shall expire first

Date:

Date: 5/02/03

For and on behalf of:
Intermountain Power Service Corporation.

For and on behalf of
ALSTOM Power Inc.

Name George W. Cross

Name : Wim F. (Bill) Eisma

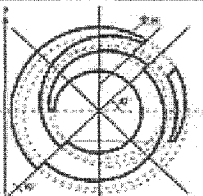
Position President & Chief Operations Officer

Position : Director Retrofit Projects

Signature : 

Signature : _____

IP7008361



TSR Project Name: Delta 1 HP

2nd Questionnaire from Febr. 2003 to April 2003

ଦେଉଳ

After PAC

Poor		Mediocre		Adequate		Good		Excellent	
1	2	3	4	5	6	7	8	9	10

- 1 ● How do you rate ALSTOM's project execution?

								x	
--	--	--	--	--	--	--	--	---	--
- 2 ● How do you rate ALSTOM's site performance?

								x	
--	--	--	--	--	--	--	--	---	--
- 3 ● Are you satisfied with ALSTOM's documentation and O&M Manual?

				x					
--	--	--	--	---	--	--	--	--	--
- 4 ● Does ALSTOM meet the time schedule regarding delivery dates and site activities?

--	--	--	--	--	--	--	--	--	--
- 5 ● Are you satisfied with the Quality of the equipment?

							8		
--	--	--	--	--	--	--	---	--	--
- 6 ● Are punch-list items completed expeditiously ?

								9	
--	--	--	--	--	--	--	--	---	--
- 7 ● Are you satisfied with ALSTOM's training on site?

						7			
--	--	--	--	--	--	---	--	--	--
- 8 ● Does the unit perform according contractual requirements ?

							8		
--	--	--	--	--	--	--	---	--	--
- 9 ● Are you satisfied with ALSTOM's products and services?

								9	
--	--	--	--	--	--	--	--	---	--
- 10 ● Are you satisfied with ALSTOM's after sales service?

								9	
--	--	--	--	--	--	--	--	---	--

Please put "x" into the range which reflects your rating most.

IP7008362

From: <bill.eisma@power.alstom.com>
To: <phong-d@ipsc.com>
Date: 6/17/2003 1:29:40 PM
Subject: Delta 1. Customer Satisfaction

Phong,

I send the attached form with a letter dated May 2, 2003. This might have got lost somehow somewhere, I would therefore appreciate if you could take a couple of minutes to complete the attached and return it so we can enter your opinions into our data base.

Thanks,

Bill

(See attached file: Cust.Sat.Survey (after PAC).xls)

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IP7008363

From: <kevin.spires@power.alstom.com>
To: "Phong Do" <PHONG-D@ipsc.com>
Date: 2/13/03 9:43AM
Subject: Delta unit 1. US Vendors info.

Phong

details of the other guys.

I'll have to try and get approx dates off Wally.

Regards

Kevin

Laser Measurement Services Inc, 301 Montreal Street, Playa Del Ray, CA
90293
Mr. Martin J. Morris, Tel.: (310) 822-585, Fax: (310) 822-9394, E-mail:
mmlms@attbi.com

FARO Arm Rental.
Edison ESI, 7300 Fenwick Lane, Westminster, CA 92683

Mr. Marco Parize, Tel.: (714) 895-0151, Fax: (714) 895-0298, E-mail:
Marco.Parize@sce.com

New E-Control Cards Supply + Installation
NovaTech., 328 South Link Lane Ste. 13, Fort Collins. CO 80524
Mr. Joe Hovorka, Tel.: (970) 224-2223, Fax: (970) 224-1700, E-mail:
novatech@novatechcorp.net

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IP7008364



CERTIFICATE OF PLACING EQUIPMENT INTO SERVICE

Purchaser : Intermountain Power Service Corporation

Equipment: HP Steam Path Components for Delta unit 1 HP Retrofit.

Contract # : 01-45510 dated April 9, 2001.

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Date:

Date: 5/02/03

For and on behalf of:
Intermountain Power Service Corporation.

For and on behalf of
ALSTOM Power Inc.

Name George W. Cross

Name : Wim F. (Bill) Eisma

Position President & Chief Operations Officer

Position : Director Retrofit Projects

Signature : _____

Signature : _____

ALSTOM Power Inc.
2800 Waterford Lake Drive
Midlothian, VA 23112

takocer.xls

IP7008365

From: <kevin.spire@power.alstom.com>
To: "Phong Do" <PHONG-D@ipsc.com>
Date: 2/13/03 9:02AM
Subject: Re: Security Info

Phong - Mike Jones will be there to measure IP.

Bill - Can you provide names / dates of novatech, laser & Faro guys please?

Kevin

----- Forwarded by Kevin SPIRES/GBRUG01/Power/ALSTOM on
13/02/2003 15:50 -----

Wally FALCONER
13/02/2003 15:15

To: Kevin SPIRES/GBRUG01/Power/ALSTOM@GA
cc:

Subject: Re: Security Info (Document link: Kevin SPIRES)

Kevin

Rugby personnel attending site

Wally Falconer	Technical Service Engr	expected arrival at
site	24th February 2003	
Ray McLoughlin	Service Engineer	28th February
2003		
Mike Storey	Service Engineer	28th February
2003		
Mike Jones	Design Engineer	7th March 2003
Mike Knibb	Test Engineer	1st April
2003		

Wally

Kevin SPIRES
13/02/2003 14:04

To: Wally FALCONER/GBRUG01/Power/ALSTOM, Dave
MURPHY/GBRUG01/Power/ALSTOM@GA
cc:

Subject: Security Info

Please note this.

IP7008366

Do we know who is going with Wally yet?

Kevin

----- Forwarded by Kevin SPIRES/GBRUG01/Power/ALSTOM on
13/02/2003 14:01 -----

"Phong Do" <PHONG-D@ipsc.com> on 13/02/2003 14:00:34

To: Bill Eisma/USRIC02/Power/ALSTOM@GA, Kevin
SPIRES/GBRUG01/Power/ALSTOM@GA
cc: Wally FALCONER/GBRUG01/Power/ALSTOM@GA

Subject: Security Info

Dear Bill/Kevin,

I need, ASAP, all people names, company names and estimated date of arrival of all contractors/subcontractors (ie from Alstom, Laser Measurement, Faro Arm, Nova Tech...) that Alstom will use for this U1 HP retrofit. Please see note below from our company vice president. Thanks.

"As of today (2/12/03) there has only been three "contractor information" turned into Security. I need to have each of you contract administrators make sure you give Security the information they need about your contractor as soon as possible. They need this info before the Unit One Outage starts. Thank you for your help."

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IP7008367

CONFIDENTIALITY:

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CC: <bill.eisma@power.alstom.com>

IP7008368



CUSTOMER SERVICE
TECHNICAL SERVICE SECTION

CHECKLIST REFERENCE NO.

1175

CONTRACT: INTERMOUNTAIN

UNIT NUMBER: 1

ST NUMBER: 11246

COMPLETED COPY

SECTIONS 1 - 9

THE ENCLOSED DOCUMENTS FORM A RECORD OF MEASUREMENTS TAKEN
DURING STRIPDOWN / REBUILD OF THE MACHINE IDENTIFIED ABOVE

IP7008369



CUSTOMER SERVICE
TECHNICAL SERVICE SECTION

CHECKLIST REFERENCE NO.

1175

CONTRACT: INTERMOUNTAIN

UNIT NUMBER: 1

ST NUMBER: 11246

Signed: _____ for Stripdown

Signed: _____ for Rebuild

THE ENCLOSED DOCUMENTS FORM A RECORD OF MEASUREMENTS TAKEN
DURING STRIPDOWN / REBUILD OF THE MACHINE IDENTIFIED ABOVE

IP7008370



CUSTOMER SERVICE
TECHNICAL SERVICE SECTION

CHECKLIST SECTION INDEX

Checklist No. 1175

<u>SECTION</u>	<u>TITLE</u>
1	QUALITY PLAN
	TURBINE STRIPDOWN
2	HP CYLINDER
3	COUPLINGS AND PEDESTALS
4	Not used
	TURBINE REBUILD
5	HP CYLINDER WORKS BUILD
6	HP CYLINDER SITE BUILD
7	HP CYLINDER MACHINING DATA
8	COUPLINGS
9	BEARINGS AND PEDESTALS

IP7008371

FIELD QUALITY PLAN PAGE 1 of 1

PLAN TYPE: OVERHAUL

CONTRACT PLAN No: IM/01/001

PREPARED BY: W.H. FALCONER

TITLE: 2003 HP REPLANT

CONTRACT NAME: INTERMOUNTAIN

ISSUE DATE : FEBRUARY 2003

UNIT No: 1

REVISION: A FEBRUARY 2003

APPROVAL REFERENCE

A = Approval required

C = Copy of document required

E = Examine cert./document

ABBREVIATIONS :-

H = Hold point

I = In-process check

N = Notify readiness for test

R = Review required

S = Surveillance

X = Originator of Inspn/document

NOTE : Prior to commencement of any section of the following Field Quality Plan, reference documents and acceptance standards, identified in columns 6 & 7, must be verified as the current issues.

NO.	COMPONENT/ACTIVITY	REQUIREMENT	TYPE OF CHECK	QUANTITY OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE STANDARD	RECORD FORMAT	AGENCY				REMARKS	DWG REV
								SUB	ALST	CUST			
1	TURBINE CHECKLIST (STRIPDOWN AND REBUILD)	CLEARANCE CHECKS	MEASUREMENT	100%	N/A	MACHINE DRAWINGS	CHECKLIST REF No. 1175		X I S A	C		SECTIONS 2 to 9	

IP7008372

From: <wally.falconer@power.alstom.com>
To: "Phong Do" <PHONG-D@ipsc.com>
Date: 4/9/03 2:07AM
Subject: Intermountain Unit 1 HP replant - checklist (1)

Hello Phong

As promised I am forwarding a copy of the checklist in unapproved form. The formal copy will arrive in due course. Because the file sizes are quite large I am sending it in two separate emails. (Sections 2,6,7,8 & index)

(See attached file: 6HP-RBUS.pdf) (See attached file: CL_INDEX.pdf)

Hope you are enjoying getting to know your family again ! I know I am.

Best regards, Wally

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This e-mail and any attachments are confidential and may be privileged. If you are not a named recipient, please notify the sender immediately and do not disclose the contents to another person, use it for any purpose, or store or copy the information in any medium.

IP7008374

From: Richard Houston
To: Dave Spence; James Nelson; Phong Do
Date: 2/4/03 12:55PM
Subject: Measurements for 8th stage diaphragm

I have attached two data sheets for measurements on the 8th stage diaphragm. I would like to get this info while the Fero arm is here for Alstom. Even if we don't install the spare 8th stage diaphragm in the IP this info will be helpful in the future.

On the rotor wheel diameters (cover and root radial seal) we need the 8th stage in particular but info on all the stages would be great to have if they are going to be taking the data anyway.

Thanks for your help in this.

By the way - these can be printed out by using Windows imaging, selecting 11 x 17 paper, and printing to fit the page.

If you can see some changes needed let me know

Rick

CC: Kelly Cloward

IP7008375

From: <kevin.spires@power.alstom.com>
To: "Phong Do" <PHONG-D@ipsc.com>
Date: 4/8/03 9:51AM
Subject: Outage Programme

Hi Phong

Try this.

It doesn't have an IP but you may be able to work out what needs doing to insert your own IP portion.

If I can be of any further help just let me know.

If not I will see you next Tuesday.

Regards

Kevin

This is the best we can do at this time & have attached as a PDF and compressed Suretrak back up. I assume you have Primavera

Susqanna HP 3LP replant

(See attached file: Hplp.prx) (See attached file: SureTrak_ HPLP.pdf)

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IP7008376

From: Phong Do
To: kevin.spires@power.alstom.com
Date: 4/23/03 8:35AM
Subject: Re: Intermountain IP Rotor Cooling

Kevin,

Thanks for the comments and efforts of finding the root-caused problem and alternative. However, there was not an explanation for the increased of the IP cooling absolute temperature. The U1 IP cooling current temperature is about 14F and 16F higher than U2 & U1 preoutage, respectively. Would you please:

1. Double check and send us a heat balance diagram for U1 showing all HP stages steam conditions (P,T, h...).
2. Provide some comment regarding IP rotor creep life that effected by 940F IP cooling.
3. Some reasons why the IP cooling temperature is higher
4. Resolution to cool the IP cooling steam.

I double checked the U1 IP double flow (9th stage) diaphragm packing, spill strip radial clearances, the L' wheel to diaphragm axial clearances and found that all clearances are within GE spec and the as-lefts were also close to the as-found.

The U1 IP double flow (IPDF) stage was also replaced with spare one during this outage. No mechanical damages or concern were noted at the as-left. Noticed that we also replaced the IPDF on Unit 2.

Even there were higher temperature response (with the IP cooling steam flow) between the GE and TE (for both units), we are not looking for resolution to even out the differences between the GE and TE. As we tracked back 365 days, the IPDF (of both units) show that there was a consistently temperature differences between the TE and GE. But they were never came in alarm. If we can cool down the U1 IP cooling by 14F, there would not be any alarm.

Mike and I both look at the IP cooling drain line and orifice and agreed that the orifices are for draining only and not for cooling.

One possible resolution is to tight the cold reheat (exhaust) into the IP cooling (at proper position, pressure location) to cool the cooling steam.

GE is not recommending us the raise the alarm set point.

Our plant manager is quite concern about the alarm. He would like to resolve this ASAP. Please help. Thanks.

—

CC: Alan.holmes@power.alstom.com; robert.brown@power.alstom.com;
robert.cunningham@power.alstom.com

IP7008377

From: Phong Do
To: Aaron Nissen; Dave Spence; James Nelson; Jerry Hintze
Date: 4/16/03 9:33AM
Subject: Response from GE

FYI, reponse from GE regarding U1 IP cooling.

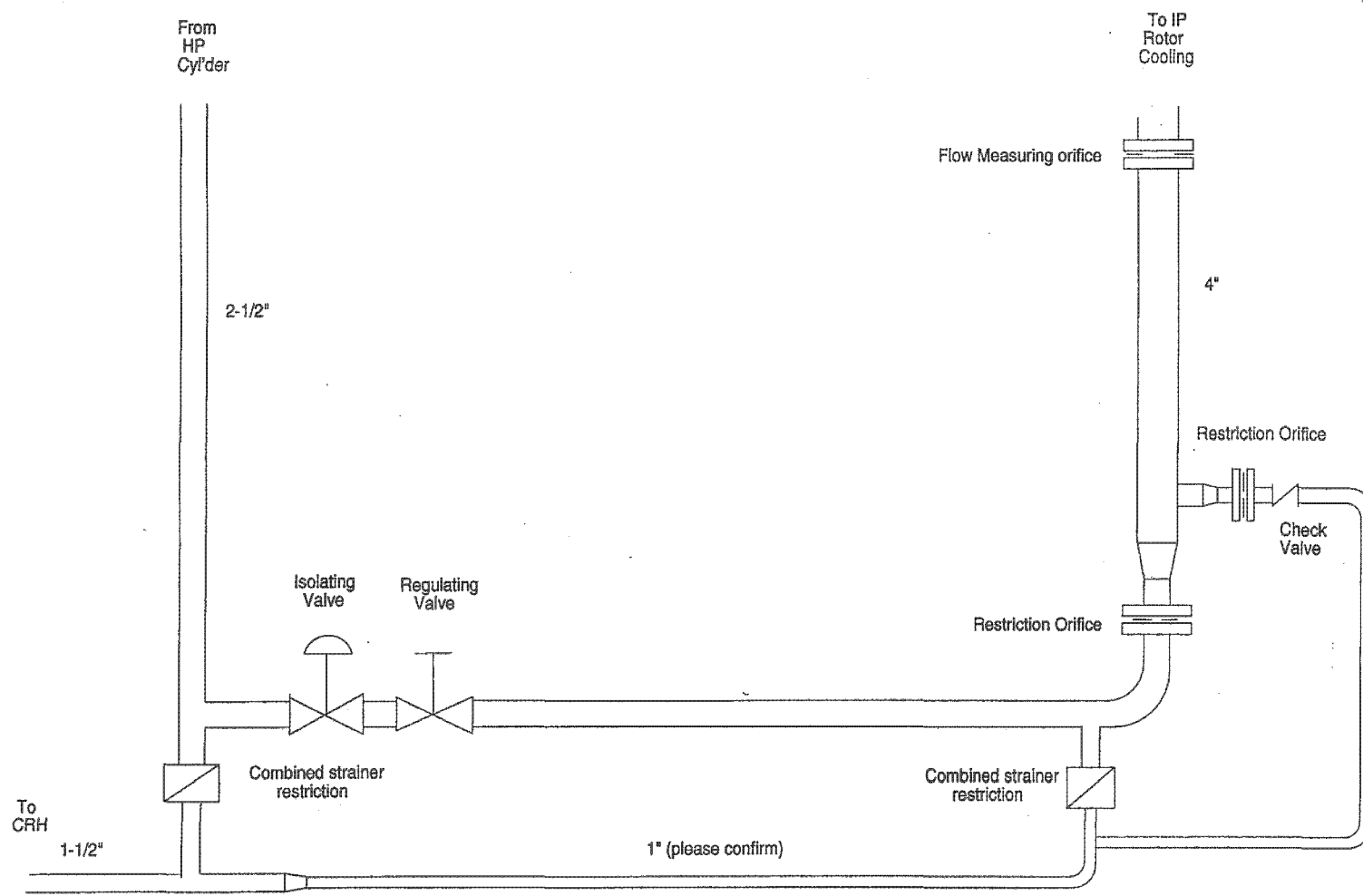
"Phong, Hope this info helps. Bob, The design of the unit requires that the temperature of the 8th stage be controlled to the values provided. There is no "margin" in this number. This value was established during the design of the unit and the flow engineered to produce that result. The issue is with the long term rupture life of the rotor bore, wheel and dovetail.

The 8th stage wheelspace temperature is a function of the cooling flow, the cooling steam temperature and the condition of the 8th stage diaphragm. The cooling flow comes from the 2nd stage of the HP turbine and is controlled by the cooling steam valve (SRCV). As the condition of the 8th stage deteriorates the cooling valve (SRCV can be opened to pass additional cooling flow, and lower the 8th stage wheelspace temperature. Before proceeding the following should be reviewed:

- 1) Is the cooling valve (SRCV) wide open so that no additional cooling steam can be admitted into the 8th stage wheelspace?
- 2) Has the temperature been increasing gradually, or has it always been high?

Having a 20F difference between units is not unrealistic as the temperature is controlled by the position of the cooling valve (SRCV) and each unit might be set differently and have slightly different flow areas."

IP7008378



IP7008379

SUSQUEHANNA HP & LP REPLANTS

Drawing No. CS/RM/SUS/00691 Issue A

ID	WBS Code	Activity Description	Dur	Total Float	Early Start	Early Finish	DAY
0001	01	General	919 *	0	23-03-02	03-05-02	0001
0002	01	Turbine shutdown	0	83h	23-03-02 0:00 *		0002
0003	01	Turbine cooling	56	83h	23-03-02 0:00	25-03-02 8:00	0003
0004	01	Delag HP cylinder	36	84h	23-03-02 20:00	25-03-02 8:00	0004
0005	01	Issue Permit For Work	0	83h	25-03-02 8:00		0005
0006	01	Assess turbine catenary	5	212h	27-03-02 23:00	28-03-02 4:00	0006
0007	01	Assess rotor alignments	5	166h	30-03-02 4:00	30-03-02 10:00	0007
0008	01	Assess rotor alignments (new rotors)	5	22h	06-04-02 22:00	07-04-02 3:00	0008
0009	01	Assess rotor alignments	5	15h	23-04-02 14:00	23-04-02 19:00	0009
0010	01	Oil flush ready	0	1h	30-04-02 3:00		0010
0011	01	Relag HP cylinder	36	0	01-05-02 15:00	03-05-02 3:00	0011
0012	01	Clear Permit For Work	0	17h		02-05-02 9:00	0012
0013	01	Turbine available for barring	0	17h		02-05-02 9:00	0013
0014	01	Turbine available for steam	0	0		03-05-02 3:00	0014
0015	02	No.1 Pedestal	829 *	2h	25-03-02	01-05-02	0015
0016	02	Unbolt & remove pedestal cover	6	89h	25-03-02 8:00	25-03-02 14:00	0016
0017	02	Unbolt & remove keep & top half No.1 bearing	4	147h	25-03-02 14:00	25-03-02 18:00	0017
0018	02	Journal, bearing & pedestal checks	5	113h	27-03-02 5:00	27-03-02 11:00	0018
0019	02	Check No.1 bearing height	2	219h	27-03-02 14:00	27-03-02 16:00	0019
0020	02	Remove btm half No.1 bearing	1	105h	30-03-02 22:00	30-03-02 23:00	0020
0021	02	NDE No.1 bearing	5	118h	31-03-02 8:00	31-03-02 13:00	0021
0022	02	No.1 bearing dimensional checks	5	114h	01-04-02 11:00	01-04-02 16:00	0022
0023	02	Adjust No.1 bearing	5	100h	02-04-02 6:00	02-04-02 12:00	0023
0024	02	Check No.1 bearing bedding	10	97h	02-04-02 15:00	03-04-02 1:00	0024
0025	02	Refit btm half No.1 bearing	1	64h	04-04-02 12:00	04-04-02 13:00	0025
0026	02	Remove btm half No.1 bearing	1	22h	07-04-02 22:00	07-04-02 23:00	0026
0027	02	Refit btm half No.1 bearing	1	134h	08-04-02 12:00	08-04-02 13:00	0027
0028	02	Adjust No.1 bearing	5	94h	23-04-02 19:00	24-04-02 0:00	0028
0029	02	Fit pedestal flushing pipe	2	40h	28-04-02 9:00	28-04-02 11:00	0029
0030	02	No.1 pedestal oil flush	5	3h	30-04-02 3:00	30-04-02 8:00	0030
0031	02	Remove pedestal flushing pipe	1	3h	30-04-02 8:00	30-04-02 9:00	0031
0032	02	Fit & bolt top half No.1 bearing	3	3h	30-04-02 9:00	30-04-02 12:00	0032
0033	02	Check No.1 bearing keep nip	5	2h	30-04-02 13:00	30-04-02 18:00	0033
0034	02	Fit & bolt No.1 bearing keep	3	2h	30-04-02 18:00	30-04-02 21:00	0034
0035	02	Fit & set supervisory equipment	10	2h	30-04-02 21:00	01-05-02 7:00	0035
0036	02	Fit & bolt pedestal cover	5	2h	01-05-02 8:00	01-05-02 13:00	0036
0037	03	HP Cylinder	621 *	244h	25-03-02	22-04-02	0037
0038	03	Fit btm half cylinder erection packers	4	101h	25-03-02 8:00	25-03-02 12:00	0038
0039	03	Unbolt top inlet pipes	20	101h	25-03-02 8:00	26-03-02 4:00	0039
0040	03	Unbolt exhaust pipes	40	81h	25-03-02 8:00	27-03-02 1:00	0040
0041	03	Unbolt & remove top half 'bolt on' glands	6	79h	26-03-02 0:00	26-03-02 6:00	0041
0042	03	Bolt heat & remove outer half joint fasteners	20	79h	26-03-02 6:00	27-03-02 3:00	0042
0043	03	Remove top half outer cylinder	5	79h	27-03-02 3:00	27-03-02 9:00	0043
0044	03	Unbolt & remove top half diaphragms (12)	24	79h	27-03-02 9:00	28-03-02 10:00	0044
0045	03	Mark top half outer cylinder gland position	4	142h	27-03-02 11:00	27-03-02 15:00	0045
0046	03	Unbolt & remove top half outer cylinder glands	12	79h	28-03-02 10:00	28-03-02 22:00	0046
0047	03	Remove HP rotor	5	69h	29-03-02 9:00	29-03-02 14:00	0047
0048	03	Remove btm half outer cylinder glands	4	69h	29-03-02 14:00	29-03-02 18:00	0048
0049	03	Remove btm half diaphragms (12)	24	69h	29-03-02 14:00	30-03-02 15:00	0049
0050	03	Blend top half outer cylinder to exhaust gland	40	96h	29-03-02 15:00	31-03-02 9:00	0050
0051	03	Remove btm half nozzle plate	20	90h	30-03-02 1:00	30-03-02 22:00	0051
0052	03	Mark btm half outer cylinder gland position	4	69h	30-03-02 15:00	30-03-02 19:00	0052
0053	03	Blend btm half outer cylinder to exhaust gland	40	69h	30-03-02 19:00	01-04-02 13:00	0053
0054	03	Remove top half nozzle plate	20	88h	30-03-02 20:00	31-03-02 17:00	0054
0055	03	Clean btm half diaphragm & gland grooves	16	80h	31-03-02 9:00	01-04-02 1:00	0055
0056	03	Clean top half diaphragm & gland grooves	16	80h	31-03-02 9:00	01-04-02 1:00	0056
0057	03	Clean btm half outer cylinder half joint	10	78h	31-03-02 17:00	01-04-02 3:00	0057
0058	03	Clean top half outer cylinder half joint	10	78h	31-03-02 19:00	01-04-02 5:00	0058
0059	03	Fit & bolt top half outer cylinder	15	67h	01-04-02 15:00	02-04-02 6:00	0059
0060	03	Machine nozzle plates sealing faces	30	58h	02-04-02 8:00	03-04-02 18:00	0060
0061	03	Unbolt & remove top half outer cylinder	15	65h	03-04-02 19:00	04-04-02 11:00	0061
0062	03	Fit top half nozzle plates	20	313h	05-04-02 1:00	05-04-02 22:00	0062
0063	03	Fit new HP rotor	5	42h	05-04-02 12:00	05-04-02 17:00	0063
0064	03	Remove HP rotor	5	22h	07-04-02 15:00	07-04-02 22:00	0064
0065	03	Set laser & position btm half outer cylinder	10	21h	08-04-02 0:00	08-04-02 12:00	0065
0066	03	Set laser gear & map half joint	10	21h	08-04-02 12:00	09-04-02 0:00	0066
0067	03	Fit btm half nozzle plates	20	21h	09-04-02 0:00	10-04-02 0:00	0067
0068	03	Fit btm half diaphragms (12)	104	20h	09-04-02 1:00	14-04-02 5:00	0068
0069	03	Fit btm half outer cylinder glands	4	16h	14-04-02 5:00	14-04-02 11:00	0069



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ABB ALSTOM POWER

ACA —
Calculate: Peak
Display: Quantity
Interval: Day
— Limit line

IP7008380


Drawing No. CS/RM/SUS/00691 Issue A

ACA  

Calculate: Peak

Display: Quantity

Interval: Day

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IP7008381

SUSQUEHANNA HP & LP REPLANTS

Drawing No. CS/RM/SUS/00691 Issue A

ID	WBS Code	Activity Description	Dur	Total Float	Early Start	Early Finish	DAY																			
0480	04	Unbolt & remove top half No.2 bearing	2	77h	25-04-02 6:00	25-04-02 9:00																				
0132	04	Remake HP/LP1 coupling & set concentric	15	23h	27-04-02 17:00	28-04-02 9:00																				
0133	04	Fit pedestal flushing pipes	4	38h	28-04-02 9:00	28-04-02 13:00																				
0134	04	Rebuild thrust bearing	8	34h	28-04-02 9:00	28-04-02 17:00																				
0135	04	No.2 pedestal oil flush	5	1h	30-04-02 3:00	30-04-02 8:00																				
0136	04	Remove pedestal flushing pipes	2	1h	30-04-02 8:00	30-04-02 10:00																				
0137	04	Fit & bolt top half No.3 bearing	3	1h	30-04-02 10:00	30-04-02 13:00																				
0138	04	Fit & bolt top half No.2 bearing	3	0	30-04-02 11:00	30-04-02 14:00																				
0139	04	Fit & bolt No.3 bearing keep	3	1h	30-04-02 13:00	30-04-02 16:00																				
0140	04	Fit & bolt No.2 bearing keep	3	0	30-04-02 14:00	30-04-02 17:00																				
0141	04	Fit & set supervisory equipment	10	0	30-04-02 17:00	01-05-02 3:00																				
0142	04	Fit & bolt pedestal covers	11	0	01-05-02 3:00	01-05-02 15:00																				
0143	05	LP1 Cylinder	557 *	308h	25-03-02	19-04-02																				
0144	05	Remove hood doors	4	94h	25-03-02 8:00	25-03-02 12:00																				
0146	05	Unbolt front & rear gland housings & diffusers	10	78h	26-03-02 0:00	26-03-02 11:00																				
0145	05	Unbolt hood	30	78h	26-03-02 0:00	27-03-02 7:00																				
0148	05	Remove hood	8	76h	27-03-02 10:00	27-03-02 18:00																				
0149	05	Unbolt top half inner cylinder	20	76h	27-03-02 18:00	28-03-02 15:00																				
0151	05	Unbolt & remove inner cyl bled steam bellows	40	121h	27-03-02 18:00	29-03-02 12:00																				
0150	05	Cut steam inlet pipes	20	122h	27-03-02 20:00	28-03-02 18:00																				
0152	05	Remove top half inner cylinder	5	69h	28-03-02 22:00	29-03-02 3:00																				
0157	05	Remove front & rear gland housings & diffusers	4	102h	29-03-02 3:00	29-03-02 7:00																				
0153	05	Measure inlet pipes datum	4	119h	29-03-02 18:00	29-03-02 22:00																				
0154	05	Measure inner cylinder bled steam bellows datum	8	100h	30-03-02 10:00	30-03-02 18:00																				
0158	05	Remove LP1 rotor	5	72h	30-03-02 15:00	30-03-02 20:00																				
0159	05	Unbolt & remove front & rear b h gland diffusers	6	72h	30-03-02 20:00	31-03-02 2:00																				
0156	05	Cut inner cylinder bled steam pipes (8)	40	322h	30-03-02 20:00	01-04-02 18:00																				
0160	05	Unbolt & remove front & rear btm half diffusers	20	72h	31-03-02 2:00	31-03-02 23:00																				
0161	05	Unbolt & remove btm half inner cylinder	10	67h	01-04-02 4:00	01-04-02 15:00																				
0163	05	Fit temporary inner cylinder palm packers	20	82h	01-04-02 15:00	02-04-02 12:00																				
0164	05	Modify keel plate & steelwork	80	58h	01-04-02 15:00	05-04-02 15:00																				
0165	05	Lift out old inner cyl bled steam bellows	8	78h	01-04-02 23:00	02-04-02 7:00																				
0162	05	Fit temporary axial keys & btm key packers	8	83h	02-04-02 2:00	02-04-02 11:00																				
0155	05	Clean hood	30	430h	02-04-02 12:00	03-04-02 19:00																				
0166	05	Lift in new inner cyl bled steam bellows	8	70h	02-04-02 16:00	03-04-02 0:00																				
0167	05	Lift out old steam inlet bellows	2	64h	03-04-02 2:00	03-04-02 4:00																				
0168	05	Lift in new steam inlet bellows	2	62h	03-04-02 6:00	03-04-02 9:00																				
0169	05	Position new btm half inner cylinder	10	57h	03-04-02 14:00	04-04-02 0:00																				
0170	05	Position new btm half inlet cylinder	10	57h	04-04-02 0:00	04-04-02 11:00																				
0171	05	Fit & bolt inner cylinder bled steam bellows	40	293h	04-04-02 0:00	05-04-02 18:00																				
0173	05	Fit & bolt front & rear b h gland diffusers	6	42h	04-04-02 20:00	05-04-02 2:00																				
0174	05	Btm half diaphragm laser check	8	28h	05-04-02 17:00	06-04-02 1:00																				
0172	05	Bolt inlet cylinder bled steam bellows (2)	20	365h	05-04-02 18:00	06-04-02 16:00																				
0175	05	Measure inlet pipes datum	2	330h	06-04-02 1:00	06-04-02 3:00																				
0178	05	Fit, weld & NDE B S pipe flanges (8)	80	273h	06-04-02 1:00	10-04-02 1:00																				
0176	05	Size inlet bellows spacers	4	330h	06-04-02 3:00	06-04-02 9:00																				
0179	05	Fit new LP1 rotor	5	27h	06-04-02 3:00	06-04-02 10:00																				
0177	05	Machine inlet bellows spacers	20	303h	06-04-02 15:00	07-04-02 15:00																				
0180	05	Check blade tip & axial datum	3	22h	07-04-02 3:00	07-04-02 6:00																				
0182	05	Shaft gland top leads	6	213h	07-04-02 3:00	07-04-02 11:00																				
0181	05	Size inner cylinder btm key & palm packers	4	186h	07-04-02 8:00	07-04-02 12:00																				
0183	05	Size inner cylinder axial key packers	4	208h	07-04-02 12:00	07-04-02 16:00																				
0187	05	Machine inner cylinder btm key packers	20	202h	07-04-02 12:00	08-04-02 12:00																				
0184	05	Machine inner cylinder palm packers	40	182h	07-04-02 12:00	09-04-02 12:00																				
0186	05	Remove LP1 rotor	5	202h	08-04-02 0:00	08-04-02 5:00																				
0189	05	Adjust shaft gland clearances	40	202h	08-04-02 5:00	10-04-02 5:00																				
0188	05	Machine inner cylinder axial key packers	20	175h	09-04-02 12:00	10-04-02 12:00																				
0191	05	Fit inner cylinder btm key & palm packers	20	192h	09-04-02 12:00	10-04-02 12:00																				
0190	05	Fit inner cylinder axial key packers	5	187h	10-04-02 12:00	10-04-02 17:00																				
0185	05	Renew spray cooling pipework	80	184h	10-04-02 17:00	14-04-02 17:00																				
0192	05	Prepare cylinder for final box up	5	162h	11-04-02 0:00	11-04-02 5:00																				
0193	05	Final fit LP1 rotor	5	170h	11-04-02 21:00	12-04-02 2:00																				
0194	05	Check rotor bumping clearances	3	170h	12-04-02 2:00	12-04-02 5:00																				
0195	05	Fit & bolt top half inlet gland	4	170h	12-04-02 5:00	12-04-02 11:00																				
0196	05	Fit & bolt stage 1-4 top half diaphragms	7	168h	12-04-02 13:00	12-04-02 22:00																				
0197	05	Fit & bolt stage 5-8 top half diaphragms	10	164h	13-04-02 2:00	13-04-02 14:00																				
0199	05	Check rotor bumping clearances	3	164h	13-04-02 14:00	13-04-02 17:00																				
0198	05	Fit & bolt top half inlet cylinder	25	155h	14-04-02 16:00	15-04-02 20:00																				
0200	05	Fit & bolt inlet pipes, bellows & spacers	20	180h	14-04-02 23:00	15-04-02 20:00																				

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Display: Quantity
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ABB ALSTOM POWER

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IP7008382

SUSQUEHANNA HP & LP REPLANTS

Drawing No. CS/RW/SUS/00691 Issue A

ID	WBS Code	Activity Description	Dur	Total Float	Early Start	Early Finish	DAY																							
0201	05	Refit front & rear gland housings & diffusers	4	192h	15-04-02 3:00	15-04-02 7:00																								
0202	05	Fit & bolt top half inner cylinder	25	149h	16-04-02 2:00	17-04-02 4:00																								
0203	05	Complete spray cooling pipework	20	149h	16-04-02 8:00	17-04-02 4:00																								
0204	05	Refit & bolt hood	48	149h	17-04-02 4:00	19-04-02 6:00																								
0206	05	Refit hood doors	4	314h	19-04-02 6:00	19-04-02 11:00																								
0205	05	Bolt front & rear gland housings & diffusers	10	263h	19-04-02 6:00	19-04-02 17:00																								
0207	06	No.3 Pedestal	838 *	27h	25-03-02	01-05-02																								
0208	06	Unbolt & remove pedestal covers	6	80h	25-03-02 8:00	25-03-02 14:00																								
0209	06	Remove keep & top half No.4 bearing	4	80h	25-03-02 14:00	25-03-02 18:00																								
0210	06	Remove keep & top half No.5 bearing	4	78h	25-03-02 16:00	25-03-02 20:00																								
0211	06	Split LP1/LP2 coupling	10	78h	25-03-02 20:00	26-03-02 6:00																								
0212	06	Check LP1/LP2 alignment	5	78h	26-03-02 6:00	26-03-02 12:00																								
0213	06	Check Nos.4 & 5 bearing heights	4	93h	26-03-02 12:00	26-03-02 16:00																								
0214	06	Journal, bearing & pedestal checks	10	125h	27-03-02 21:00	28-03-02 7:00																								
0215	06	Recheck LP1/LP2 alignment	5	82h	29-03-02 23:00	30-03-02 4:00																								
0217	06	Remove bottom half No.5 bearing	1	114h	01-04-02 1:00	01-04-02 2:00																								
0220	06	NDE No.5 bearing	5	102h	01-04-02 2:00	01-04-02 9:00																								
0216	06	Remove bottom half No.4 bearing	1	112h	01-04-02 3:00	01-04-02 4:00																								
0221	06	No.5 bearing dimensional checks	5	116h	01-04-02 9:00	01-04-02 14:00																								
0218	06	NDE No.4 bearing	5	92h	01-04-02 14:00	01-04-02 21:00																								
0219	06	No.4 bearing dimensional checks	5	95h	02-04-02 6:00	02-04-02 12:00																								
0222	06	Adjust No.5 bearing	5	50h	04-04-02 11:00	04-04-02 16:00																								
0223	06	Adjust No.4 bearing	5	48h	04-04-02 13:00	04-04-02 18:00																								
0225	06	Check No.5 bearing bedding	10	50h	04-04-02 16:00	05-04-02 2:00																								
0224	06	Check No.4 bearing bedding	10	42h	05-04-02 0:00	05-04-02 11:00																								
0227	06	Refit btm half No.5 bearing	1	42h	05-04-02 11:00	05-04-02 12:00																								
0226	06	Refit btm half No.4 bearing	1	27h	06-04-02 2:00	06-04-02 3:00																								
0228	06	Check LP1/LP2 alignment	5	22h	06-04-02 15:00	06-04-02 22:00																								
0229	06	Size LP1/LP2 coupling spacer	5	211h	07-04-02 8:00	07-04-02 13:00																								
0230	06	Machine LP1/LP2 coupling spacer	60	231h	10-04-02 13:00	13-04-02 13:00																								
0238	06	Check LP1/LP2 alignment	5	136h	18-04-02 2:00	18-04-02 7:00																								
0239	06	Adjust No.5 bearing	10	13h	23-04-02 21:00	24-04-02 7:00																								
0240	06	Adjust No.4 bearing	10	11h	23-04-02 23:00	24-04-02 10:00																								
0241	06	Final LP1/LP2 alignment check	5	9h	24-04-02 12:00	24-04-02 17:00																								
0231	06	Make LP1/LP2 coupling & set concentric	20	9h	24-04-02 17:00	25-04-02 14:00																								
0242	06	Set pedestal oil wipers	20	106h	24-04-02 17:00	25-04-02 14:00																								
0232	06	Hone 4 off LP1/LP2 coupling bolt holes	6	9h	25-04-02 14:00	25-04-02 20:00																								
0233	06	Machine 4 off LP1/LP2 coupling bolt sleeves	6	7h	25-04-02 17:00	26-04-02 1:00																								
0234	06	Recheck LP1/LP2 coupling concentricity	4	8h	26-04-02 1:00	26-04-02 5:00																								
0235	06	Complete LP1/LP2 coupling bolt hole honing	24	8h	26-04-02 5:00	27-04-02 6:00																								
0237	06	Split & clean LP1/LP2 coupling	10	8h	27-04-02 6:00	27-04-02 17:00																								
0236	06	Complete LP1/LP2 coupling bolt sleeve machining	24	6h	27-04-02 21:00	29-04-02 1:00																								
0243	06	Remake LP1/LP2 coupling & set concentric	15	1h	29-04-02 8:00	29-04-02 23:00																								
0244	06	Fit pedestal flushing pipes	4	1h	29-04-02 23:00	30-04-02 3:00																								
0245	06	No.3 pedestal oil flush	5	33h	30-04-02 3:00	30-04-02 8:00																								
0246	06	Remove pedestal flushing pipes	2	32h	30-04-02 8:00	30-04-02 10:00																								
0247	06	Fit & bolt top half No.5 bearing	3	30h	30-04-02 12:00	30-04-02 15:00																								
0248	06	Fit & bolt top half No.4 bearing	3	27h	30-04-02 15:00	30-04-02 18:00																								
0249	06	Check No.5 bearing keep nip	5	30h	30-04-02 15:00	30-04-02 20:00																								
0250	06	Check No.4 bearing keep nip	5	27h	30-04-02 18:00	30-04-02 23:00																								
0252	06	Fit & bolt No.5 bearing keep	3	29h	30-04-02 21:00	01-05-02 0:00																								
0253	06	Fit & bolt No.4 bearing keep	3	27h	30-04-02 23:00	01-05-02 2:00																								
0251	06	Fit & set supervisory equipment	10	27h	01-05-02 2:00	01-05-02 13:00																								
0254	06	Fit & bolt pedestal covers	9	27h	01-05-02 13:00	01-05-02 22:00																								
0255	07	LP2 Cylinder	565 *	300h	25-03-02	20-04-02																								
0256	07	Remove hood doors	4	126h	25-03-02 8:00	25-03-02 12:00																								
0258	07	Unbolt front & rear gland housings & diffusers	10	107h	26-03-02 3:00	26-03-02 14:00																								
0257	07	Unbolt hood	30	97h	26-03-02 14:00	27-03-02 21:00																								
0259	07	Remove hood	8	87h																										

SUSQUEHANNA HP & LP REPLANTS

Drawing No. CS/RM/SUS/00691 Issue A

ID	WBS Code	Activity Description	Dur	Total Float	Early Start	Early Finish	DAY
0272	07	Unbolt & remove front & rear btm half diffusers	20	76h	30-03-02 22:00	31-03-02 19:00	0272
0273	07	Unbolt & remove btm half inner cylinder	10	72h	31-03-02 23:00	01-04-02 10:00	0273
0276	07	Fit temporary axial keys & btm key packers	8	99h	01-04-02 10:00	01-04-02 18:00	0276
0274	07	Fit temporary inner cylinder palm packers	20	87h	01-04-02 10:00	02-04-02 6:00	0274
0275	07	Modify keel plate & steelwork	80	63h	01-04-02 10:00	05-04-02 10:00	0275
0277	07	Lift out old inner cyl bled steam bellows	8	86h	01-04-02 15:00	01-04-02 23:00	0277
0278	07	Lift in new inner cyl bled steam bellows	8	78h	02-04-02 8:00	02-04-02 16:00	0278
0267	07	Clean hood	30	430h	02-04-02 12:00	03-04-02 19:00	0267
0279	07	Lift out old steam inlet bellows	2	66h	03-04-02 0:00	03-04-02 2:00	0279
0280	07	Lift in new steam inlet bellows	2	64h	03-04-02 4:00	03-04-02 6:00	0280
0281	07	Position new btm half inner cylinder	10	62h	03-04-02 9:00	03-04-02 19:00	0281
0282	07	Position new btm half inlet cylinder	10	62h	03-04-02 19:00	04-04-02 5:00	0282
0283	07	Fit & bolt inner cylinder bled steam bellows	40	298h	03-04-02 19:00	05-04-02 13:00	0283
0284	07	Fit & bolt front & rear b h gland diffusers	6	44h	04-04-02 18:00	05-04-02 0:00	0284
0285	07	Btm half diaphragm laser check	8	44h	05-04-02 0:00	05-04-02 9:00	0285
0287	07	Measure inlet pipes datum	2	346h	05-04-02 9:00	05-04-02 11:00	0287
0288	07	Size inlet bellows spacers	4	323h	05-04-02 11:00	05-04-02 15:00	0288
0291	07	Fit new LP2 rotor	5	42h	05-04-02 12:00	05-04-02 17:00	0291
0286	07	Bolt inlet cylinder bled steam bellows (2)	20	370h	05-04-02 13:00	06-04-02 11:00	0286
0290	07	Fit, weld & NDE B S pipe flanges (8)	80	283h	05-04-02 13:00	09-04-02 13:00	0290
0289	07	Machine inlet bellows spacers	20	323h	05-04-02 15:00	05-04-02 15:00	0289
0292	07	Check blade tip & axial datum	3	186h	07-04-02 3:00	07-04-02 6:00	0292
0293	07	Shaft gland top leads	6	211h	07-04-02 5:00	07-04-02 13:00	0293
0294	07	Size inner cylinder btm key & palm packers	4	186h	07-04-02 8:00	07-04-02 12:00	0294
0295	07	Size inner cylinder axial key packers	4	208h	07-04-02 12:00	07-04-02 16:00	0295
0298	07	Machine inner cylinder palm packers	40	182h	07-04-02 12:00	09-04-02 12:00	0298
0299	07	Remove LP2 rotor	5	197h	08-04-02 5:00	08-04-02 12:00	0299
0296	07	Machine inner cylinder btm key packers	20	182h	08-04-02 12:00	09-04-02 12:00	0296
0300	07	Adjust shaft gland clearances	40	197h	08-04-02 12:00	10-04-02 12:00	0300
0297	07	Machine inner cylinder axial key packers	20	175h	09-04-02 12:00	10-04-02 12:00	0297
0302	07	Fit inner cylinder btm key & palm packers	20	182h	10-04-02 0:00	11-04-02 0:00	0302
0303	07	Renew spray cooling pipework	80	199h	10-04-02 0:00	14-04-02 0:00	0303
0301	07	Fit inner cylinder axial key packers	5	187h	10-04-02 12:00	10-04-02 17:00	0301
0304	07	Prepare cylinder for final box up	5	177h	11-04-02 5:00	11-04-02 12:00	0304
0305	07	Final fit LP2 rotor	5	177h	11-04-02 12:00	11-04-02 17:00	0305
0306	07	Check rotor bumping clearances	3	172h	12-04-02 0:00	12-04-02 3:00	0306
0307	07	Fit & bolt top half inlet gland	4	168h	12-04-02 9:00	12-04-02 13:00	0307
0308	07	Fit & bolt stage 1-4 top half diaphragms	7	164h	12-04-02 17:00	13-04-02 2:00	0308
0309	07	Fit & bolt stage 5-8 top half diaphragms	10	156h	13-04-02 12:00	14-04-02 0:00	0309
0310	07	Check rotor bumping clearances	3	156h	14-04-02 0:00	14-04-02 3:00	0310
0313	07	Fit & bolt top half inlet cylinder	25	163h	14-04-02 8:00	15-04-02 12:00	0313
0311	07	Refit front & rear gland housings & diffusers	4	188h	15-04-02 8:00	15-04-02 12:00	0311
0314	07	Fit & bolt top half inner cylinder	25	163h	15-04-02 12:00	16-04-02 14:00	0314
0315	07	Complete spray cooling pipework	20	163h	15-04-02 17:00	16-04-02 14:00	0315
0312	07	Fit & bolt inlet pipes, bellows & spacers	20	143h	16-04-02 14:00	17-04-02 11:00	0312
0316	07	Refit & bolt hood	48	141h	17-04-02 13:00	19-04-02 15:00	0316
0317	07	Refit hood doors	4	306h	19-04-02 15:00	19-04-02 19:00	0317
0318	07	Bolt front & rear gland housings & diffusers	10	291h	19-04-02 15:00	20-04-02 1:00	0318
0319	08	No.4 Pedestal	371 *	10h	25-03-02	02-05-02	0319
0320	08	Unbolt & remove pedestal covers	6	103h	25-03-02 17:00	25-03-02 23:00	0320
0321	08	Remove keep & top half No.6 bearing	4	103h	25-03-02 23:00	26-03-02 3:00	0321
0322	08	Remove keep & top half No.7 bearing	4	101h	26-03-02 1:00	26-03-02 5:00	0322
0323	08	Split LP2/LP3 coupling	10	95h	26-03-02 12:00	26-03-02 22:00	0323
0324	08	Check LP2/LP3 alignment	5	95h	26-03-02 22:00	27-03-02 3:00	0324
0325	08	Check Nos.6 & 7 bearing heights	4	104h	27-03-02 10:00	27-03-02 14:00	0325
0326	08	Journal, bearing & pedestal checks	10	125h	27-03-02 21:00	28-03-02 7:00	0326
0327	08	Recheck LP2/LP3 alignment	5	87h	29-03-02 18:00	29-03-02 23:00	0327
0328	08	Remove bottom half No.6 bearing	1	150h	30-03-02 12:00	30-03-02 13:00	0328
0329	08	Remove bottom half No.7 bearing	1	149h	30-03-02 13:00	30-03-02 14:00	0329
0330	08	NDE No.6 bearing	5	133h	30-03-02 13:00	30-03-02 18:00	0330
0332	08	NDE No.7 bearing	5	128h	30-03-02 20:00	31-03-02 1:00	0332
0331	08	No.6 bearing dimensional checks	5	123h	01-04-02 1:00	01-04-02 6:00	0331
0333	08	No.7 bearing dimensional checks	5	123h	01-04-02 1:00	01-04-02 6:00	0333
0334	08	Adjust No.7 bearing	5	55h	04-04-02 5:00	04-04-02 11:00	0334
0335	08	Adjust No.6 bearing	5	53h	04-04-02 8:00	04-04-02 13:00	0335
0336	08	Check No.6 bearing bedding	10	52h	04-04-02 14:00	05-04-02 0:00	0336
0337	08	Check No.7 bearing bedding	10	44h	04-04-02 22:00	05-04-02 9:00	0337
0338	08	Refit btm half No.6 bearing	1	44h	05-04-02 9:00	05-04-02 10:00	0338
0339	08	Refit btm half No.7 bearing	1	36h	05-04-02 17:00	05-04-02 18:00	0339

Run date 08-04-03 8:00
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Page count 7A
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ABB ALSTOM POWER

ACA
Calculate: Peak
Display: Quantity
Interval: Day
Limit line

IP7008384

Drawing No. CS/RM/SUS/00691 Issue A

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Page number	6A
Page count	7A
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ACA  
Calculate: Peak
Display: Quantity
Interval: Day
 Limit line

IP7008385

SUSQUEHANNA HP & LP REPLANTS

Drawing No. CS/RM/SUS/00691 Issue A

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0404	09	Check blade tip & axial datum	3	186h	07-04-02 3:00	07-04-02 6:00																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					

ACA Calculate: Peak
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Interval: Day
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ABB ALSTOM POWER

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IP7008386

Phil Hailes'
Print Outs
Proceed
This Sheet

From: Richard Houston
To: Dave Spence; James Nelson; Phong Do
Date: 2/4/03 12:55PM
Subject: Measurements for 8th stage diaphragm

I have attached two data sheets for measurements on the 8th stage diaphragm. I would like to get this info while the Fero arm is here for Alstom. Even if we don't install the spare 8th stage diaphragm in the IP this info will be helpful in the future.

On the rotor wheel diameters (cover and root radial seal) we need the 8th stage in particular but info on all the stages would be great to have if they are going to be taking the data anyway.

Thanks for your help in this.

By the way - these can be printed out by using Windows imaging, selecting 11 x 17 paper, and printing to fit the page.

If you can see some changes needed let me know

Rick

CC: Kelly Cloward

IP7008388

From: <kevin.spires@power.alstom.com>
To: "Phong Do" <PHONG-D@ipsc.com>
Date: 4/8/03 9:51AM
Subject: Outage Programme

Hi Phong

Try this.

It doesn't have an IP but you may be able to work out what needs doing to insert your own IP portion.

If I can be of any further help just let me know.

If not I will see you next Tuesday.

Regards

Kevin

This is the best we can do at this time & have attached as a PDF and compressed Suretrak back up. I assume you have Primavera

Susqanna HP 3LP replant
(See attached file: Hplp.prx) (See attached file: SureTrak_ HPLP.pdf)

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IP7008389

From: Phong Do
To: kevin.spires@power.alstom.com
Date: 4/23/03 8:35AM
Subject: Re: Intermountain IP Rotor Cooling

Kevin,

Thanks for the comments and efforts of finding the root-caused problem and alternative. However, there was not an explanation for the increased of the IP cooling absolute temperature. The U1 IP cooling current temperature is about 14F and 16F higher than U2 & U1 preoutage, respectively. Would you please:

1. Double check and send us a heat balance diagram for U1 showing all HP stages steam conditions (P,T, h...).
2. Provide some comment regarding IP rotor creep life that effected by 940F IP cooling.
3. Some reasons why the IP cooling temperature is higher
4. Resolution to cool the IP cooling steam.

I double checked the U1 IP double flow (9th stage) diaphragm packing, spill strip radial clearances, the L' wheel to diaphragm axial clearances and found that all clearances are within GE spec and the as-lefts were also close to the as-found.

The U1 IP double flow (IPDF) stage was also replaced with spare one during this outage. No mechanical damages or concern were noted at the as-left. Noticed that we also replaced the IPDF on Unit 2.

Even there were higher temperature response (with the IP cooling steam flow) between the GE and TE (for both units), we are not looking for resolution to even out the differences between the GE and TE. As we tracked back 365 days, the IPDF (of both units) show that there was a consistently temperature differences between the TE and GE. But they were never came in alarm. If we can cool down the U1 IP cooling by 14F, there would not be any alarm.

Mike and I both look at the IP cooling drain line and orifice and agreed that the orifices are for draining only and not for cooling.

One possible resolution is to tight the cold reheat (exhaust) into the IP cooling (at proper position, pressure location) to cool the cooling steam.

GE is not recommending us the raise the alarm set point.

Our plant manager is quite concern about the alarm. He would like to resolve this ASAP. Please help. Thanks.

—

CC: Alan.holmes@power.alstom.com; robert.brown@power.alstom.com;
robert.cunningham@power.alstom.com

IP7008390

From: Phong Do
To: Aaron Nissen; Dave Spence; James Nelson; Jerry Hintze
Date: 4/16/03 9:33AM
Subject: Response from GE

FYI, reponse from GE regarding U1 IP cooling.

"Phong, Hope this info helps. Bob, The design of the unit requires that the temperature of the 8th stage be controlled to the values provided. There is no "margin" in this number. This value was established during the design of the unit and the flow engineered to produce that result. The issue is with the long term rupture life of the rotor bore, wheel and dovetail.

The 8th stage wheelspace temperature is a function of the cooling flow, the cooling steam temperature and the condition of the 8th stage diaphragm. The cooling flow comes from the 2nd stage of the HP turbine and is controlled by the cooling steam valve (SRCV). As the condition of the 8th stage deteriorates the cooling valve (SRCV can be opened to pass additional cooling flow, and lower the 8th stage wheelspace temperature. Before proceeding the following should be reviewed:

- 1) Is the cooling valve (SRCV) wide open so that no additional cooling steam can be admitted into the 8th stage wheelspace?
- 2) Has the temperature been increasing gradually, or has it always been high?

Having a 20F difference between units is not unrealistic as the temperature is controlled by the position of the cooling valve (SRCV) and each unit might be set differently and have slightly different flow areas."

From: Richard Houston
To: Dave Spence; Phong Do
Date: 2/12/03 2:46PM
Subject: 8th stage diaphragm snout bore measurements

Attached is a chart showing the measurements we need to get for the spare 8th stage diaphragm cooling steam snout bore so the rings can be finish machined.

Rick

CC: Kelly Cloward

IP7008392

Name	Address	Size
Mike Ally	98 North 100 East Hinckley UT 84635	XL
Will Lovell	6260 N 2000 W Delta UT 84624	XL
Brad Thompson	220 W 100 N Delta UT 84624	XXL
Kelly Cloward	518 E 280 N Delta UT 84624	XL
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Phong Do		
Craig Teeples	260 W 300 S Fillmore UT 84631	XL
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Dean Smith	1546 W 1500 S Delta UT 84624	XXL
Wayne Spencer	1095 W Ashby Rd Delta UT 84624	XL
Elven Stokes	P.O. Box 38071 Leamington UT 84638	XXL
Bob Terry	6405 N 3000 W Delta UT 84624	XXXL

From: <robert.cunningham@power.alstom.com>
To: <phong-d@ipsc.com>
Date: 4/25/03 10:12AM
Subject: Intermountain IP Rotor Cooling

Hello Phong

Please find attached a sketch showing our proposal.

Can you please confirm the sketch shows the configuration of your existing pipework (both in terms of pipe sizes and orientation of valves, orifices etc)

Can you please provide the T and P of the IP rotor cooling pipework prior to both the Unit 1 and 2 outage, and if possible the flows.

Our engineer would like to size a new control orifice in the existing pipework and will provide a new orifice in the extension to the pipework.

Can you please comment on our proposal.

Regards

Rob C

----- Forwarded by Robert CUNNINGHAM/GBRUG01/Power/ALSTOM
on 25/04/2003 16:53 -----

Alan LANG
25/04/2003 15:46

To: Robert CUNNINGHAM/GBRUG01/Power/ALSTOM@GA, Alain
FOOTE/LTR/STG/PGD/GECALSTHOM@GA
cc:

Subject: Intermountain IP Rotor Cooling

Rob,

We hope to emulate the original cooling steam flow and temperature by suitable mixing of stage #3 extraction and CRH steam.

In order to do this we require the cooling steam pressure and temperature (and flow if measured as different from design of 11,000 lb/hr) just upstream of the IP Cylinder connection so that we can advise suitably sized restriction orifices.

Attached is the proposed layout based on what we know of the system. The check valve is necessary so that we do not vent away the IP rotor warming steam during the warm-up phase.

Please ask Client for this information and to comment on the attached

IP7008394

sketch.

Regards,

Alan

(See attached file: Rotor_Cooling.tif)

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CC: <alan.lang@power.alstom.com>, <alain.foote@power.alstom.com>, <kevin.spires@power.alstom.com>, <RUGWW.TEGMail@test.alstom.com>, <tim.shurrock@power.alstom.com>, <robert.brown@power.alstom.com>

IP7008395

From: Richard Houston
To: Dave Spence; Phong Do
Date: 2/12/03 2:46PM
Subject: 8th stage diaphragm snout bore measurements

Attached is a chart showing the measurements we need to get for the spare 8th stage diaphragm cooling steam snout bore so the rings can be finish machined.

Rick

CC: Kelly Cloward

IP7008396

From: <robert.cunningham@power.alstom.com>
To: <phong-d@ipsc.com>
Date: 4/25/03 10:12AM
Subject: Intermountain IP Rotor Cooling

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----- Forwarded by Robert CUNNINGHAM/GBRUG01/Power/ALSTOM
on 25/04/2003 16:53 -----

Alan LANG
25/04/2003 15:46

To: Robert CUNNINGHAM/GBRUG01/Power/ALSTOM@GA, Alain
FOOTE/LTR/STG/PGD/GEALSTHOM@GA
cc:

Subject: Intermountain IP Rotor Cooling

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IP7008397

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Regards,

Alan

(See attached file: Rotor_Cooling.tif)

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CC: <alan.lang@power.alstom.com>, <alain.foote@power.alstom.com>, <kevin.spires@power.alstom.com>, <RUGWW.TEGMail@test.alstom.com>, <tim.shurrock@power.alstom.com>, <robert.brown@power.alstom.com>

IP7008398

Intermountain Unit 1 IP Rotor 8th Stage/IP Rotor Cooling Temperatures.

IPS have identified a concern with the IP Rotor 8th Stage/IP Rotor Cooling, since some of the temperature readings are close to the operational alarm limits. They have suggested that this is due to the cooling steam temperature being hotter on Unit 1 than was is on Unit 2.

We have been studying the information that we have collated and can make the following observations:-

Based on the instrumentation readings we have received from site:-

- there is a temperature difference of only about 14°F between Unit 1 and Unit 2 in the cooling steam pipe.
- it would appear that the TE rotor flow is being starved of cooling steam flow.
- the GE rotor temperature is satisfactory, even with low cooling steam flows (total cooling flow of 8,000lbs/hr).
- when we plot the temperature drop of TE and GE, we see that the cooling steam flow has a much larger effect on the GE thermocouple, thus further suggesting that TE is receiving reduced flow of cooling steam.

We have looked at the design of the original inlet gland/diaphragms and note the following differences between the TE and GE design.

- the GE diaphragms (fixed blades) are integral with the inlet gland.
- the TE diaphragms are carried by the inlet gland.
- if the pressure face of the TE diaphragm has been damaged during the outage, or the inner ring half joint opens in service, the pressure adjacent to the disc may increase, causing a reduced cooling steam flow in the TE direction.

Reasons why you may have a starved flow of steam at TE are:-

- differences in radial clearance of front (TE) and rear (GE) gland segments.
- damage to TE diaphragm pressure face.
- inner ring of TE diaphragm opening up in service (or open when rebuilt).

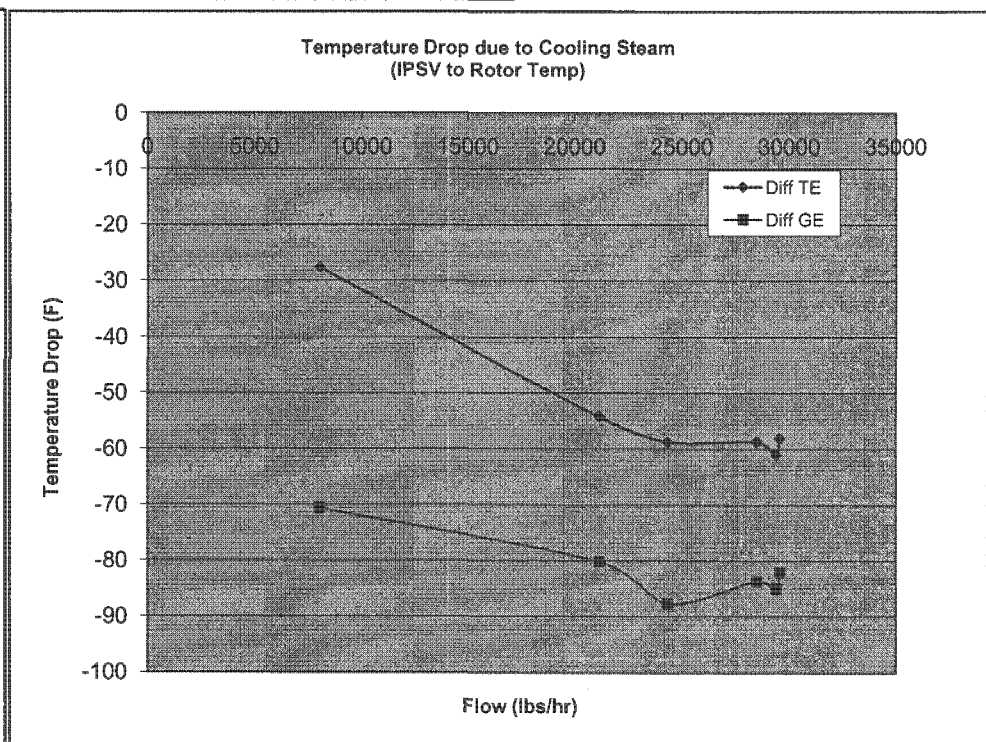
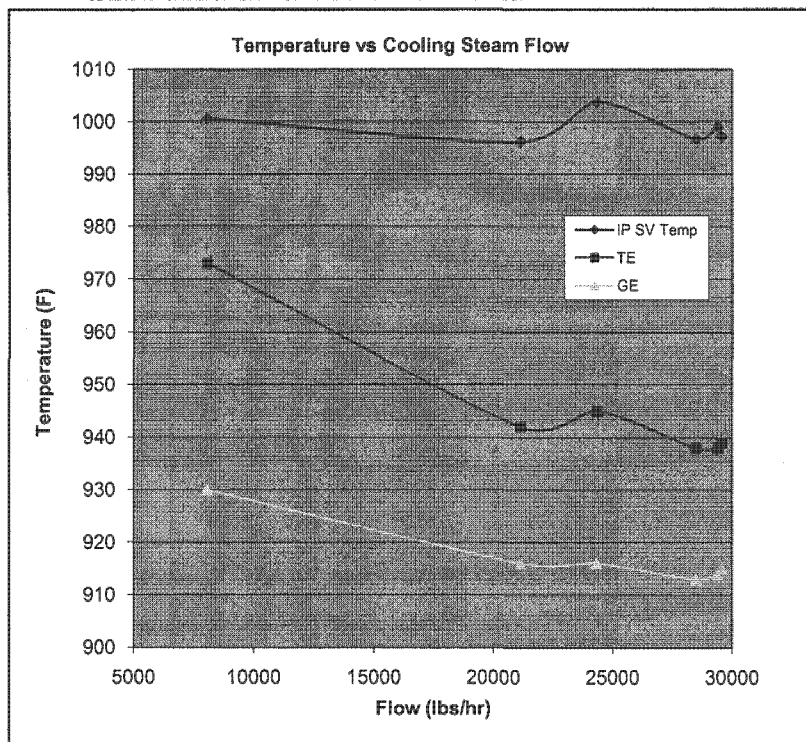
We have also studied the As Built Records of both HP Retrofit Unit 1 and 2 and can confirm that there are no differences between the 2 machines, in terms of build clearances, etc which might otherwise have caused a difference in the cooling steam temperature.

We therefore conclude that the main issue is the difference between front and rear flows, rather than the absolute temperature itself.

Name	Address	Size
Mike Ally	98 North 100 East Hinckley UT 84635	XL
Will Lovell	6260 N 2000 W Delta UT 84624	XL
Brad Thompson	220 W 100 N Delta UT 84624	XXL
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Dean Smith	1546 W 1500 S Delta UT 84624	XXL
Wayne Spencer	1095 W Ashby Rd Delta UT 84624	XL
Elven Stokes	P.O. Box 38071 Leamington UT 84638	XXL
Bob Terry	6405 N 3000 W Delta UT 84624	XXXL

Flow	IP SV Temp	TE	GE
29572	997.1	939	915
29403	999	938	914
28491	996.7	938	913
24329	1003.7	945	916
21138	996.2	942	916
8053	1000.6	973	930

Flow	Diff TE	Diff GE
29572	-58.1	-82.1
29403	-61	-85
28491	-58.7	-83.7
24329	-58.7	-87.7
21138	-54.2	-80.2
8053	-27.6	-70.6



ALSTOM**FAX****Power**
Steam Turbines

To: Phong Do
Turbine & QA Lead Engineer
IPSC
Fax: 00 1 435 864 0775
cc: A. Bramley, Retrofit Project Management

From: Gary Randle
Project Support Group (Quality)
Tel: 01788 531957
Fax: 01788 531281
E-mail: gary.randle@power.alstom.com

N° of pages: 6

Date: 11 March, 2002

Subject: INTERMOUNTAIN 1 HP ROTOR

Please find attached a copy of the Stage 2 Ultrasonic & Visual reports for the Intermountain 1 HP Rotor, as requested.


Regards



Newbold Road
Rugby, Warwickshire
CV21 2NH England
Tel.: +44 (0) 1788 577111
Fax: +44 (0) 1788 531700

ALSTOM Power UK Ltd
Registered Office:
Lindum House
Sewall Road
Lincoln, LN2 5RY
Registered in England No. 476835

IP7008403

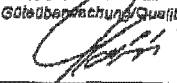
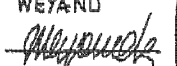
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Bestell-Nr./Order No. / No. de Commande 300845CARTW06, Ident No. RF 113218	Lieferbedingungen/Spezifikationen/specifications QCP No. 0529/001 Issue B, STV M41101 Issue A		
Bestell-Nr./Order No. / No. de Com. 63 11 031	Werkstoff/Qualitätsstufe 25 Cr Mo V 3-8	Zeichnungs-Nr./Drawing No./No du Plan R201/A0/3229 Rev. C	
Baugruppe-Nr./Part No. / No de Côté MP- Rotor Forging	Bauteil-Nr./Part No. / No de Côté 155003	Stück-Nr. - Kern-Nr. / Piece No - Ident No 696520	
Stage of Examination: Stade de l'examen	Stage 1 - Before quality heat treatment, ungashed Stade 1 - Avant traitement thermique de qualité, non entaillé		
Date of Examination: Date de l'examen	05. 03. 2002		
Surface Roughness: Etat de surface	6,3 µm Ra		
Amount of Examination: Etendue de l'examen	All zones Toutes zones		
Examination Method: Methode de l'examen	Visually using a lamp with visible light intensity of min. 500 Lux Visuelle avec une lampe (capacité d'éclairage: min. 500 Lux)		
Operator/Qualification: Opérateur/ Qualification	R. Weyand L. II (ASNT TC 1A)		
Result of Examination: Résultat de l'examen	No indication noted		
		SAARSCHMIEDE GmbH Güteüberwachung/Qualitätssicherung  Employee in Charge Employé Compétent	

6311031

036 520

SAARSCHMIEDE GmbH Preformschmiede # 66330 Völklingen		Abnahmeprüfzeugnis nach EN 10204 - 3.1 b Ultrasonic Examination Examen par ultrasons				Report No./No. Rapport Blatt 1 von 4 Page 1 von 4					
Bestell-Nr. / Order-No. / No. de commande 300946CRTW06, Ident No. RF 113218				Lieferbedingungen / Specifications / Specifications: QCP No. 0529/001 Issue B, STV M41101 Issue A							
Schreibe-Nr. / Order-No. / No. de Com.: 63 11 031				Werkstoff / Quality / Matière: 25 Cr Mo V 3-8		Zeichnungs-Nr. / Drawg.-No. / No du plan: R201/A0/3229 Rev. C					
Gegenstand / Item / Product: HP- Rotor Forging				Schmelz-Nr. / Heat-No. / No de Coulee: 155003		Stück-Nr. / Kenn-Nr. / Piece No. - Ident No.: 696520					
Stage of examination: Stade d'examen: STAGE 2, AFTER QUALITY HEAT TREATMENT											
Specification: Spécification: STVM 41101 A				Surface Condition: L'état de surface: machined 6,3 Ra usinée							
Equipment / No.: Appareil / No.: Krautkrämer USIP 11 A4.9				Couplant Medium: Milieu de couplage: Oil / SAE 30 Huile							
1	2	3	4	5	6	7	8	9	10	11	12
Dia. ref. (mm)	Ref. Zone	Thickness (mm)	Probe / angle	DWV (dB)	FOHE (dB)	Adm. Correction (dB)	BWE 1a 40% FSN (dB)	FBHE zone (dB)	Reference sensitivity (dB)	Scanning sensitivity (dB)	Detectability Limit et CL EFH (dB)
Ø 701	3	350.5	B45E	14	51	3	24	34	58	64	1.1
Ø 641	2.3	320.5	B45E	14	49	2	26	33	59	65	1.1
Ø 701	2.3	350.5	B45E	14	51	3	26	34	58	64	1.1
Ø 902	1,2,3	451	B45E	16	55	4	26	35	61	67	1.1
Ø 648	3	324	B45E	14	49	4	26	31	57	63	1.1
Ø 795	2.3	397.5	B45E	15	53	4	26	34	60	66	1.1
Ø 1-6	1,2,3	100	SEB40°	0	(1.0) 42	—	K1-25mm 16	42	58	64	0.7
Ø 701	3	340	B25E-14°	20	62	—	22	42	64	70	1.1
Remarks/Remarques:											
Test Result: Résultat de l'examen											
Radial: <input checked="" type="checkbox"/> acceptable / No recordable indication noted accepté / Sans indication notables											
Axial: <input checked="" type="checkbox"/> acceptable / No recordable indication noted accepté / Sans indication notables											
<input type="checkbox"/> Indication subject to decision: Indication dépassant le seuil de notation: (Test Report - see Annex) (voir rapport de l'examen en annexe)											
Date of Examination: Date de l'examen: 05.03.2002 Operator - Name: Opérateur - Nom: WEYAND				SAARSCHMIEDE GmbH Geschäftsbereich Qualitätssicherung Geschäftsbereich (Werkstoffschulungsstellen) Département Manager Quality Control Le Chef du Contrôle				Approval: Qualification: L. II (ASNT TC 1A)			

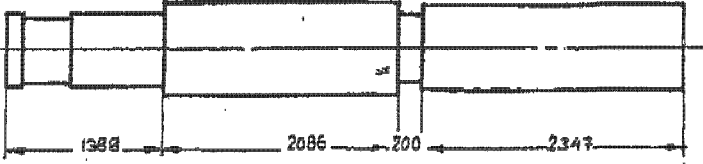
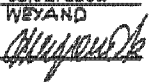
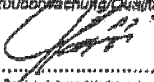
IP7008405

SAARSCHMIEDE GmbH Freiformschmiede 66330 Völklingen		Abnahmeprüfzeugnis nach EN 10204 - 3.1 B		Ultrasonic Examination Examen par ultrasons		Kunden (Name, Adresse)					
Bestell-Nr. / Order-No. / No. de Commande 300946CRTW06, Ident No. RF 113218		Lieferbedingungen / Specifications / Specifications: QCP No. 0529/001 Issue B, STV M41101 Issue A		Blatt 2 von 4 Page of							
Schmiedeauftrags-Nr. / Order-No. / No. de Com. 63 11 031		Werkstoff / Quality / Nuance 25 Cr Mo V 3-8		Zeichnungs-Nr. / Dwg.-No. / No. du plan: R201/A0/3229 Rev. C							
Gegenstand / Item / Product HP- Rotor Forging		Schmelz-Nr. / Heat-No. / No. du Cône: 155003		Stück-Nr. / Kann-Nr. / Piece No. - Ident. No. 696520							
Stage of examination: Stade d'examen:		STAGE 2									
Specification: Specification:		STV M 41101 A		Surface Condition: L'état de surface		machined usinée 6,3 Ra					
Equipment / No.: Appareil / No.:		Krautkrämer USIP 11 / A49		Couplant Medium: Milieu de couplage		Oil / SAE 30 Huile					
1 Dir. ref. Identification	2 Rotor Zone	3 Thickness Epaisseur ou distance (mm)	4 Probe / angle Treducteur / angle	5 BWE Echo de fond (dB)	6 FBWE Edge TFP 1.6 (dB)	7 Att. Correction Correction (dB)	8 BWE to 40% FSH Echo de fond à 40% hauteur d'essai (dB)	9 FBWE Sent. echo TFP (dB)	10 Reference sensitivity Sensibilité de référence (dB)	11 Scanning sensitivity Sensibilité d'examen (10% - dB)	12 Detectability Limit at 6L EPH detection min recherche 4L sepré - TFP (dB/m)
2 Ø 641	2.3	311	B25E-14°	20	59	-	24	39	63	69	1.1
3 Ø 701	2.3	340	B25E-14°	20	61	-	26	41	67	73	1.1
4 Ø 902	1.2.3	438	B25E-14°	22	65	-	26	43	69	75	1.1
5 Ø 648	3	314	B25E-14°	20	59	-	24	39	63	69	1.1
6 Ø 795	2.3	386	B25E-14°	22	63	-	24	41	65	71	1.1
1 Ø 701	3	310	B25E-28°	20	59	-	22	39	61	67	1.1
2 Ø 641	2.3	283	B25E-28°	20	58	-	24	38	62	68	1.1
3 Ø 701	2.3	310	B25E-28°	20	59	-	26	39	65	71	1.1
4 Ø 902	1.2.3	398	B25E-28°	22	64	-	26	42	68	74	1.1
5 Ø 648	3	286	B25E-28°	20	58	-	24	38	62	68	1.1
6 Ø 795	2.3	351	B25E-28°	22	62	-	24	40	64	70	1.1
1 Ø 701	3	436	WB45-2E	2	58	-	K1-0	56	56	62	1.1
2 Ø 641	2.3	453	WB45-2E	2	56	-	K1-0	54	54	60	1.1
3 Ø 701	2.3	496	WB45-2E	2	58	-	K1-0	56	56	62	1.1
Remarks/Remarques:											
Date of Examination: Date de l'examen		05.03.2002 WEYAND						SAARSCHMIEDE GmbH Güteüberwachung/Qualitätssicherung  Beauftragung (Verantwortlicher) Département Manager Quality Control Le Chef du Contrôle			
Operator - Name: Opérateur - Nom:											
Approval: Qualification:		L II (ASNT TC 1A)									

IP7008406

SAARSCHMIEDE GmbH Freiformschmiede 68330 Völklingen		Abnahmeprüfzeugnis nach EN 10204 - 3.1 B Ultrasonic Examination Examen par ultrasons				Report No./No. Rapport Blatt 3 von 4 Page 3 of 4					
Bestell-Nr. / Order-No. / No. de Commande 300946CRTW06, Ident No. RF 113218				Lieferbedingungen / Specifications / Specifications QCP No. 0529/001 Issue B, STV M41101 Issue A							
Saarschmiede-Auftrags-Nr. / Order-No. / No. de Com. 63 11 031				Werkstoff / Quality / Matière 25 Cr Mo V 3-8		Zeichnungs-Nr. / Draw.-No. / No du plan R201/A0/3229 Rev. C					
Gegenstand / Item / Product HP- Rotor Forging				Schmelze-Nr. / Heat-No. / No de Caille 155003		Stück-Nr. / Kern-Nr. / Piéce No. - Ident No. 696520					
Stage of examination: Stade d'examen: STAGE 2											
Specification: Spécification: STVM 41101 A				Surface Condition: L'état de surface: machined 6,3 Ra usinée							
Equipment / No.: Appareil / No.: KraussRomer USIP 11 / A49				Couplant Medium: Milieu de couplage: Oil / SAE 30 Huile							
1	2	3	4	5	6	7	8	9	10	11	12
Def. ref. Identification	Ref. Zona	Thickness Epaisseur ou distance (mm)	Probe / angle Tête / angle	SWE Echec de fond (dB)	FSH Cote TPP 1.6 (dB)	AWG Corrosion Corrosion d'acier (µm-0.2) (dB)	SWH to 40% FSH Echec de fond à 40% hauteur écran (dB)	FSH Sens. Sens. écho TPP (6-6)(7) (dB)	Reflection sensibilité Sensibilité de réflexion (dB)	Scanning sensibilité Sensibilité d'azimut (10) + 6 dB (dB)	Defectability Limit at 6 EFH Détection min d'acier au cœur - TEP (0 mm)
4 Ø 302	1	638	WB45-2E	2	70 (1.0)	-	K1-0	68	68	68	1.0
2 Ø 648	3	458	WB45-2E	2	56	-	K1-0	54	54	60	1.1
4 Ø 795	2.3	562	WB45-2E	2	60	-	K1-0	58	58	64	1.1
Ø -											
Ø -											
Ø -			AXIAL	TEST :	B2SE (60-80)	dB					
Ø -											
Ø -											
Ø -											
Ø -											
Ø -											
Ø -											
Ø -											
Ø -											
Remarks/Remarques: * addition of 6 dB is not possible											
Date of Examination: Date de l'examen: 05.03.2002		Operator - Name: Opérateur - Nom: WEYAND <i>[Signature]</i>		Approved: Qualification: L II (ASNT TC 1A)		SAARSCHMIEDE GmbH Güterüberwachung/Qualitätssicherung <i>[Signature]</i> Betriebsleitung (Werkssachverständiger) Département Manager Quality Control Le Chef du Contrôle					

IP7008407

SAARSCHMIEDE GmbH Freiformschmiede • 66330 Völklingen		Abnahmeprüfzeugnis nach EN 10 204 - 3.1 B		Rapport No/ No. Rapport																			
		EXAMEN PAR ULTRASONS Ultrasonic Examination		Blatt 4 von 4 Page 4 of 4																			
Donner-Nr./Order No. /No. de Commande		Liste/Bedingungen/Specifications/Spécifications																					
300946CRTW06, Ident No. RF 113218		QCP No. 0529/001 Issue B, STV M41101 Issue A																					
Saarschmiede-Auftrag-Nr./Order No./No de Com.		Werkstoff/Qualitätsbezeichnung		Zeichnungs-Nr./Drawing No./No du Plan																			
63 11 031		25 Cr Mo V 3-8		R201/A0/3229 Rev. C																			
Bauteilbezeichnung/Item/Produit		Schmelz-Nr./Heat/No de Coulee		Guss-Nr.-Kopf-Nr. / Pate No - Ident No																			
HP-Rotor Forging		155003		696520																			
Stage of examination: Stade d'examen																							
STAGE 2																							
Specification: Spécification		STV M 41101 Issue A		Surface Condition: L'état de surface:																			
				machined usinée																			
				6.3 Ra																			
Equipment / No.: Appareil / No:		Krautkrämer USIP 11 / A49		Couplant Medium: Milieu de couplage																			
				Oil / SAE 30 Huile																			
Sketch / Croquis																							
REF END 120																							
<table border="0"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr><tr><td>mm</td><td>mm</td><td>mm</td><td>mm</td><td>mm</td><td>mm</td></tr><tr><td>Ø 701</td><td>641</td><td>701</td><td>902</td><td>649</td><td>795</td></tr></table> 						1	2	3	4	5	6	mm	mm	mm	mm	mm	mm	Ø 701	641	701	902	649	795
1	2	3	4	5	6																		
mm	mm	mm	mm	mm	mm																		
Ø 701	641	701	902	649	795																		
Remarks / Remarques																							
The maximum permissible grass height at the reference sensitivity is in conformance with the table in clause 4.2.2.																							
Date of Examination Date de l'examen		05.03.2002 WEYAND		SAARSCHMIEDE GmbH Güteüberwachung/Qualitätssicherung																			
Operator - Name Opérateur - Nom																							
Author Qualification		L. II (ASNT TC 1A)		Abteilungsleiter/Werkstattverwalter Department Manager/Quality Control Le Chef du Contrôle																			

From: <kevin.spires@power.alstom.com>
To: "Phong Do" <PHONG-D@ipsc.com>
Date: 1/27/03 2:28AM
Subject: Unit 1 Shipping

Hi Phong

Here is a list of everything you will receive at site.

Wally will be there to do a full inventory as discussed during the week prior to the outage.

Regards

Kevin

(See attached file: Shipping Docs.pdf)

CONFIDENTIALITY:

This e-mail and any attachments are confidential and may be privileged. If you are not a named recipient, please notify the sender immediately and do not disclose the contents to another person, use it for any purpose, or store or copy the information in any medium.

CC: <wally.falconer@power.alstom.com>

IP7008409



INVOICE

Account No.

Attn: Ms Joan Vandenburg/Mr Bill Eisma
ALSTOM Power Inc.
Accounts Payable
2800 Waterford Lake Drive
Midlothian, VA 23112
USA

Your Order: 100318-OG
Our Order: 763R0529/02/001
Advice Note: R3006
Date of Advice: 14/01/2003
Terms of Payment: SEE 001
EC Commodity Code:

Invoice No: TS00315-25
Date: 14-Jan-03
VAT Reg No: GB 728 4619 11
VAT Group No: 105
Originator: K.Spires
Tel No: +44 (0) 1788 531979

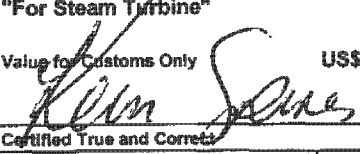
End user (if other than above)
Intermountain Power Service Corporation

Despatched per: Sea Freight

Payment Instructions:

Pay: ABN Amro Bank NV, London. Swift code: - ABNAGB2L
Via: ABN Amro bank NV, New York.
CHIPS 007535 ABA 958

Swift Code: ABNAUS33
In favour of: ALSTOM Power UK Ltd - Large Turbines Rugby
A/c: 40071456

Case No.	Dimensions	GRS WT	NET WT	Country of Origin	Currency:	USD
3275c	370cm x 234cm x 349cm	37,300kg	34,300kg	England		
SHIPPING MARK ALSTOM Power, Inc. C/O Intermountain Power Service Corporation Intermountain Generating Station (Unit 1) 850 W. Brush Wellman Road Delta Utah 84624 - 9546 USA FAO : Mr Phong Do ALSTOM Power Inc P.O Number: 100318 - OG IPSC PO Number : 314870 HP Turbine Inner Cylinder Module "For Steam Turbine" Value for Customs Only US\$ 2,110,000.00 Total \$0.00  Certified True and Correct FOB UK Port						
EC Customer		Authorised				
VAT Reg. No.		Signature:				
VAT Indicator: B		Basic Price:		\$0.00		
CARAT Code : 9159						
Tax Point 14-Jan-03		VAT at: 0.00%		0.00		
INVOICE TOTAL:						\$0.00

Newbold Road
Rugby, Warwickshire
CV21 2NH
England
Tel: +44 (0) 1788 577111
Fax: +44 (0) 1788 531700

ALSTOM Power Ltd.
Registered Office
Newbold Road
Rugby, Warwickshire
Registered in England No. 4347573

IP7008410



Customer Service Section

R6076

HOME / EXPORT NOTIFICATION

Exporter		Vehicle Bkg. Ref.	Customs Reference/Status		Tariff Heading				
		Invoice No.		Exporter's Reference					
		Customer's Reference		F/Agents Ref.	SS Co. Bkg. No.				
Consignee (If "Order" State Notify Party and Address)		Supplier ALSTOM Power Willans Works Newbold Road Rugby Warwickshire CV21 2NH England							
Forwarding Agent/Merchant		Country of Origin of Goods UK		Country of Destination USA					
Receiving Date(s)	Dock, Container Base etc.		Terms of Delivery and Payment						
Inspection Release Number(s)			Purchase Order No.		Supplier's Reference				
Vessel/Aircraft Etc.	Port of Loading	Contract No. 781R0529/02/199/018		Despatch Date					
Port of Discharge	Place of Delivery by On-Carrier	Insured Value (State Currency)		Import Permit					
Marks and Numbers and Containers No.		Number and Kind of Packages Description of Goods			Gross Weight (kg)	Cube (M ³)			
Case No.	Length (cms)	Width (cms)	Height (cms)	Net Wt. (kg)					
3275C	370	234	349	34300	37300	30.22			
Shipping Mark:						0.0			
						0.0			
						0.0			
					Net Weight (kg) 34300	FOB Value £			
Piece	HP Inner Cylinder Assy & Slings	Intermountain		Consignment Value		CPA			
Spec. Stow				Total CDV/FMV		Invoice Total (State Currency)			
				Total Net Wt. (kg) 34300		Total Gross Wt. (kg) 37300		Total Cube (M ³) 30.22	
				Signatory's Company and Telephone Number ALSTOM Power Int +44 1788 577111					
				Name of Authorised Signatory Mr G Hirons					
				Place and Date of Issue Forwarding, Rugby 14/1/03					
				Signature					

IP7008411

ALSTOM Power Steam Turbines

PACKING SPECIFICATION FOR EWN R6076

CONTRACT: INTERMOUNTAIN
 CONTRACT NO: PO NO 100318 - OG \ CUST. ORDER 314870
 CUSTOMER REF: INTERMOUNTAIN UNIT 1

INSP RELEASE:019,023

SUPPLIED TO: INTERMOUNTAIN POWER SERVICES CORP.
 850 WEST BRUSH WELLMAN RD.
 DELTA
 UTAH 84624, USA


PACKED AT : ALSTOM POWER UK LTD.
 WILLANS WORKS
 NEWBOLD ROAD

CONTACT: MR.G.HIRONS TEL 01788 531053

SHEET 1 OF 1 DATE :14/01/2003

CASE	DIMENSIONS (cm)			CAPACITY CUBIC (m)	WEIGHT (kg)	
	LENGTH	WIDTH	HEIGHT		GROSS	NET
3275C	370	234	349	30.2164	37300	34300

ITEM REFERENCE	DESCRIPTION	QUANTITY	DRAWING NO	ITEM	REFERENCE
2EMBR0000019	SLING & RIGGING SCREW	2	E247/2239G01 W247/2415P02	1	2EMBR0000019
2EMBR0000020	SLINGS SLING 6900MM LG NO ADJ	1	E247/2239G01 W247/1983P03	2	2EMBR0000020
2EMBR0000021	SLINGS SHACKLES	2	E247/2239G01 W247/1918P18	3	2EMBR0000021
2EMBR0000074	SLINGS HP INNER CYLINDER ASSEMBLY	1	E202/5366G01	0000	2EMBR0000074
	HP INNER CYLINDER ASSEMBLY				

ALSTOM Power Ltd RUGBY WORKS
 Lloyd's Approved to ISO 9001:2000
 This is to certify that all the items in the shipment detailed
 above have been subject to our inspection for adherence to
 the requirements of the Contract Document and/or Subsequent
 amendments and to the relevant design requirements and/or
 codes of practice
 Signed: 
 Quality Management

IP7008412



INVOICE

Account No.

Attn: Ms Joan Vandenburg/Mr Bill Eisma
ALSTOM Power Inc.
Accounts Payable
2800 Waterford Lake Drive
Midlothian, VA 23112
USA

Your Order:
100318-OG
Our Order:
763R0529/02/001
Advice Note:
R3006
Date of Advice:
14/01/2003
Terms of Payment:
SEE 001
EC Commodity Code:

Invoice No: **TS00314-25**
Date: 14-Jan-03
VAT Reg No. GB 728 4619 11
VAT Group No. 105
Originator: K. Spire
Tel No. +44 (0) 1788 531979

End user (if other than above)
Intermountain Power Service Corporation

Despatched per: Sea Freight

Payment Instructions:

Pay: ABN Amro Bank NV, London. Swift code: - ABNAGB2L
Via: ABN Amro bank NV, New York.
CHIPS 007535 ABA 958

Swift Code: ABNAUS33
In favour of: ALSTOM Power UK Ltd - Large Turbines Rugby
A/c: 40071456

Case No.	Dimensions	GRS WT	NET WT	Country of Origin	Currency:	USD
3274c	624cm x 169cm x 186cm	17500kg	15400kg	England		
SHIPPING MARK						
ALSTOM Power, Inc. C/O Intermountain Power Service Corporation Intermountain Generating Station (Unit 1) 850 W. Brush Wellman Road Delta Utah 84624 - 9546 USA FAO : Mr Phong Do						
ALSTOM Power Inc P.O Number: 100318 - OG IPSC PO Number : 314870 HP Turbine Rotor "For Steam Turbine"						
Value for Customs Only		US\$ 1,014,000.00		Total	\$0.00	
Certified True and Correct				FOB UK Port		
EC Customer		Authorised Signature:				
VAT Reg. No.		Basic Price:				
VAT Indicator: B		\$0.00				
CARAT Code : 9159						
Tax Point 14-Jan-03		VAT at: 0.00%		0.00		
				INVOICE TOTAL:		\$0.00

Newbold Road
Rugby, Warwickshire
CV21 2NH
England
Tel: +44 (0) 1788 577111
Fax: +44 (0) 1788 531700

ALSTOM Power Ltd.
Registered Office
Newbold Road
Rugby, Warwickshire
Registered in England No. 4347573

IP7008413

ALSTOM

Customer Service Section
HOME / EXPORT NOTIFICATION

R6075

Exporter				Vehicle Bkg. Ref.		Customs Reference/Status		Tariff Heading			
				Invoice No.				Exporter's Reference			
				Customer's Reference				F/Agents Ref.		SS Co. Bkg. No.	
Consignee (If "Order" State Notify Party and Address)				Supplier							
Forwarding Agent/Merchant				ALSTOM Power Willans Works Newbold Road Rugby Warwickshire CV21 2NH England							
				Country of Origin of Goods			Country of Destination				
Receiving Date(s)			Dock, Container Base etc.			Terms of Delivery and Payment					
Inspection Release Number(s)						Purchase Order No.		Supplier's Reference			
Vessel/Aircraft Etc.			Port of Loading			Contract No.		Despatch Date			
Port of Discharge			Place of Delivery by On-Carrier			Insured Value (State Currency)		Import Permit			
Marks and Numbers and Containers No. Case No. Length (cms) Width (cms) Height (cms) Net Wt. (kg)				Number and Kind of Packages Description of Goods				Gross Weight (kg)		Cube (M³)	
3274C 624 169 186 15400								17500		19.61	
Shipping Mark:								Net Weight (kg)		FOB Value £	
								15400			
Case				HP Rotor Assembly				Intermountain			
Spec. Stow				Consignment Value				CPA			
				Total CDV/FMV				Invoice Total (State Currency)			
				Total Net Wt. (kg)		Total Gross Wt. (kg)		Total Cube (M³)			
				15400		17500		19.61			
				Signatory's Company and Telephone Number							
				ALSTOM Power Int +44 1788 577111							
				Name of Authorised Signatory							
Mr G Hirons											
Place and Date of Issue											
Forwarding, Rugby 14/1/03											
Signature											

IP7008414

ALSTOM Power Steam Turbines

CONTRACT: INTERMOUNTAIN
CONTRACT NO: PO NO 100318 - OG \ CUST. ORDER 314870
CUSTOMER REF: INTERMOUNTAIN UNIT 1

PACKING SPECIFICATION FOR EWN. R6075

INSP RELEASE:018

SUPPLIED TO: INTERMOUNTAIN POWER SERVICES CORP.
850 WEST BRUSH WELLMAN RD.
DELTA
UTAH 84624, USA


PACKED AT : ALSTOM POWER UK LTD.
WILLIAMS WORKS
NEWBOLD ROAD

CONTACT: MR.G.HIRONS TEL 01788 531053 SHEET 1 OF 1 DATE :14/01/2003

CASE	DIMENSIONS (cm)			CAPACITY CUBIC (m)	WEIGHT (kg)	
	LENGTH	WIDTH	HEIGHT		GROSS	NET
3274C	624	169	186	19.6148	17500	15400

ITEM REFERENCE	DESCRIPTION	QUANTITY	DRAWING NO	ITEM	REFERENCE
2EMBR0000018	HP ROTOR ASSEMBLY	1			
	HP ROTOR - MACHINING		B201/3250G01		2EMBR0000018

IP7008415

ALSTOM Power Ltd RUGBY WORKS
Lloyds Approved to ISO 9001:2000
This is to certify that all the items in the shipment detailed
above have been subject to our inspection for adherence to
the requirements of the Contract Document and/or Subsequent
amendments and to the relevant design requirements and/or
codes of practice
Signed: 
Chris Rutherford, Quality Manager



INVOICE

Account No.

Attn: Ms Joan Vandenburg/Mr Bill Eisma
ALSTOM Power Inc.
Accounts Payable
2800 Waterford Lake Drive
Midlothian, VA 23112
USA

Your Order:
100318-OG
Our Order:
763R0529/02/001
Advice Note:
R3006
Date of Advice:
14/01/2003
Terms of Payment:
SEE 001
EC Commodity Code:

Invoice No: **T500316-25**
Date: 14-Jan-03
VAT Reg No. GB 728 4619 11
VAT Group No. 105
Originator: K.Spires
Tel No. +44 (0) 1788 531979

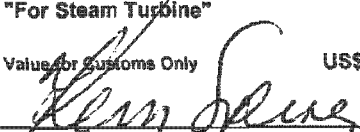
End user (if other than above)
Intermountain Power Service Corporation

Despatched per: Sea Freight

Payment Instructions:

Pay : ABN Amro Bank NV, London. Swift code: - ABNAGB2L
Via : ABN Amro bank NV, New York.
CHIPS 007535 ABA 958

Swift Code: ABNAUS33
In favour of: ALSTOM Power UK Ltd - Large Turbines Rugby
A/c: 40071456

Case No.	Dimensions	GRS WT	NET WT	Country of Origin	Currency:	USD
3273c	109cm x 109cm x 89cm	1000kg	900kg	England		
SHIPPING MARK ALSTOM Power, Inc. C/O Intermountain Power Service Corporation Intermountain Generating Station (Unit 1) 850 W. Brush Wellman Road Delta Utah 84624 - 9546 USA FAO : Mr Phong Do ALSTOM Power Inc P.O Number: 100318 - OG IPSC PO Number : 314870 Miscellaneous Items "For Steam Turbine" Value for Customs Only US\$ 164,000.00 Total \$0.00  Certified True and Correct FOB UK Port						
EC Customer		Authorised				
VAT Reg. No.		Signature:				
VAT Indicator: B		Basic Price:		\$0.00		
CARAT Code : 9159		VAT at: 0.00%		0.00		
Tax Point 14-Jan-03						
INVOICE TOTAL:						\$0.00

Newbold Road
Rugby, Warwickshire
CV21 2NH
England
Tel: +44 (0) 1788 577111
Fax: +44 (0) 1788 531700

ALSTOM Power Ltd.
Registered Office
Newbold Road
Rugby, Warwickshire
Registered in England No. 4347573

IP7008416

ALSTOM

Customer Service Section
HOME / EXPORT NOTIFICATION

R6074

Exporter				Vehicle Bkg. Ref.		Customs Reference/Status		Tariff Heading			
				Invoice No.				Exporter's Reference			
				Customer's Reference				F/Agents Ref.		SS Co. Bkg. No.	
Consignee (If "Order" State Notify Party and Address)				Supplier ALSTOM Power Willans Works Newbold Road Rugby Warwickshire CV21 2NH England							
Forwarding Agent/Merchant				Country of Origin of Goods UK		Country of Destination USA					
Receiving Date(s)		Dock, Container Base etc.		Terms of Delivery and Payment							
Inspection Release Number(s)				Purchase Order No.		Supplier's Reference					
Vessel/Aircraft Etc.		Port of Loading		Contract No. 781R0529/02/199/018		Despatch Date					
Port of Discharge		Place of Delivery by On-Carrier		Insured Value (State Currency)		Import Permit					
Marks and Numbers and Containers No.		Number and Kind of Packages Description of Goods				Gross Weight (kg)		Cube (M ³)			
Case No.	Length (cms)	Width (cms)	Height (cms)	Net Wt. (kg)							
3273C	109	109	89	900	1000		1.06				
Shipping Mark:											
					Net Weight (kg) 900		FOB Value £				
Case		Details		Intermountain		Consignment Value		CPA			
Spec. Stow						Total CDV/FMV		Invoice Total (State Currency)			
						Total Net Wt. (kg) 900		Total Gross Wt. (kg) 1000		Total Cube (M ³) 1.06	
						Signatory's Company and Telephone Number ALSTOM Power Int +44 1788 577111					
						Name of Authorised Signatory Mr G Hirons					
						Place and Date of Issue Forwarding, Rugby 14/1/03					
						Signature					

IP7008417

ALSTOM Power Steam Turbines

PACKING SPECIFICATION FOR EWN R6074

CONTRACT: INTERMOUNTAIN
CONTRACT NO: PO NO 100318 - OG \ CUST. ORDER 314870
CUSTOMER REF: INTERMOUNTAIN UNIT 1

INSP RELEASE:020,021,022,024,025,026,027

SUPPLIED TO: INTERMOUNTAIN POWER SERVICES CORP.
850 WEST BRUSH WELLMAN RD.
DELTA
UTAH 84624, USA

PACKED AT : ALSTOM POWER UK LTD.
WILLANS WORKS
NEWBOLD ROAD

CONTACT: MR.G.HIRONS TKL 01788 531053

SHEET 1 OF 7

DATE :14/01/2003

CASE	DIMENSIONS (cm)			CAPACITY CUBIC (m)	WEIGHT (kg)	
	LENGTH	WIDTH	HEIGHT		GROSS	NET
3273C	109	109	89	1.0574	1000	900

ITEM REFERENCE	DESCRIPTION	QUANTITY	DRAWING NO	ITEM	REFERENCE
2EMBR0000005	STELLITED SPOOL PIECE	1	E202/5380G01 D202/5381P01	1	2EMBR0000005
2EMBR0000011	HP CYLINDER LEAK-OFF PIPE CONNECTION FLANGE PIPE	1	E202/5397G01 D202/5349P01	1	2EMBR0000011
2EMBR0000014	HP CYLINDER LEAK-OFF PIPE CONNECTION ROTOR POSITION GAUGE	1	E247/2565G01 D247/2483P09	1	2EMBR0000014
2EMBR0000015	ROTOR POSITIONING ASSEMBLY POSITION GAUGE LABEL	1	E247/2565G01 D247/2564P01	2	2EMBR0000015
2EMBR0000016	ROTOR POSITIONING ASSEMBLY OVAL CHAIN LINK	1	E247/2565G01 W247/1970P01	3	2EMBR0000016
2EMBR0000017	ROTOR POSITIONING ASSEMBLY SCREW CLASS 8-8 H MAX10 (SEE I F40056A12)	1	E247/2565G01 21437083	4	2EMBR0000017
2EMBR0000023	ROTOR POSITIONING ASSEMBLY BALANCE WEIGHT	10	E201/3250G01 D201/2968P02	3	2EMBR0000023
	HP ROTOR - MACHINING				

Kevin Spires
9 pages
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IP7008418

ALSTOM Power Steam Turbines

PACKING SPECIFICATION FOR BWN R6074

CONTRACT: INTERMOUNTAIN
 CONTRACT NO: PO NO 100318 - OG \ CUST. ORDER 314870
 CUSTOMER REF: INTERMOUNTAIN UNIT 1

INSP RELEASE:020,021,022,024,025,026,027

SUPPLIED TO: INTERMOUNTAIN POWER SERVICES CORP.
 850 WEST BRUSH WELLMAN RD.
 DELTA
 UTAH 84624, USA

PACKED AT : ALSTOM POWER UK LTD.
 WILLIAMS WORKS
 NEWBOLD ROAD

CONTACT: MR.G.HIRONS TEL 01788 531053

SHEET 2 OF 7 DATE :14/01/2003

CASE	DIMENSIONS (cm)			CAPACITY CUBIC (m)	WEIGHT (kg)	
	LENGTH	WIDTH	HEIGHT		GROSS	NET
3273C	109	109	89	1.0574	1000	900

ITEM REFERENCE	DESCRIPTION	QUANTITY	DRAWING NO	ITEM	REFERENCE
2EMBR0000024	BALANCE WEIGHT 50G	3	E201/3250G01 D201/3034P04	4	2EMBR0000024
2EMBR0000025	HP ROTOR - MACHINING BALANCE WEIGHT 60G	3	E201/3250G01 D201/3034P05	5	2EMBR0000025
2EMBR0000026	HP ROTOR - MACHINING BALANCE WEIGHT 80G	4	E201/3250G01 D201/3034P06	6	2EMBR0000026
2EMBR0000027	HP ROTOR - MACHINING 5/16"-18 UNC HEX SOCKET SET SC REW	10	E201/3250G01 D297/1149P03	7	2EMBR0000027
2EMBR0000028	HP ROTOR - MACHINING BALANCE WEIGHT 15G	3	E201/3250G01 D201/3033P04	8	2EMBR0000028
2EMBR0000029	HP ROTOR - MACHINING BALANCE WEIGHT 16G	3	E201/3250G01 D201/3033P05	9	2EMBR0000029
2EMBR0000030	HP ROTOR - MACHINING BALANCE WEIGHT 24G	4	E201/3250G01 D201/3033P06	10	2EMBR0000030
	HP ROTOR - MACHINING				

IP7008419

ALSTOM Power Steam Turbines

PACKING SPECIFICATION FOR EHM R6074

CONTRACT: INTERMOUNTAIN
 CONTRACT NO: PO NO 100318 - OG \ CUST. ORDER 314870
 CUSTOMER REF: INTERMOUNTAIN UNIT 1

INSP RELEASE:020,021,022,024,025,026,027

SUPPLIED TO: INTERMOUNTAIN POWER SERVICES CORP.
 850 WEST BRUSH WELLMAN RD.
 DELTA
 UTAH 84624, USA

PACKED AT : ALSTOM POWER UK LTD.
 WILLIAMS WORKS
 NEWBOLD ROAD

CONTACT: MR.G.HIRONS TEL 01788 531053 SHEET 3 OF 7 DATE :14/01/2003

CASE	LENGTH	DIMENSIONS (cm)		CAPACITY CUBIC (m)	WEIGHT (kg)	
		WIDTH	HEIGHT		GROSS	NET
3273C	109	109	89	1.0574	1000	900

ITEM REFERENCE	DESCRIPTION	QUANTITY	DRAWING NO	ITEM	REFERENCE
2EMBR0000031	1/4"-20UNC-2A HEX SOCKET SET S CR	40	E201/3250G01 D297/1001P03	11	2EMBR0000031
2EMBR0000032	HP ROTOR - MACHINING SEAL RING	12	E202/5387G01 W202/5335P01	1004	2EMBR0000032
2EMBR0000033	HP INLET CONNECTION ASSEMBLY LINER	4	E202/5387G01 D202/5388P01	1	2EMBR0000033
2EMBR0000034	HP INLET CONNECTION ASSEMBLY GUIDE RING	4	E202/5387G01 D202/5390P01	2	2EMBR0000034
2EMBR0000035	HP INLET CONNECTION ASSEMBLY RETAINING RING	4	E202/5387G01 D202/5389P01	3	2EMBR0000035
2EMBR0000036	HP INLET CONNECTION ASSEMBLY DOWEL 3/8" DIA	12	E202/5387G01 D297/1000P08	5	2EMBR0000036
2EMBR0000041	HP INLET CONNECTION ASSEMBLY CASING INSERT	1	E202/5396G01 D297/1119P01	1	2EMBR0000041
	HP CYLINDER INTERFACE				

IP7008420

ALSTOM Power Steam Turbines

PACKING SPECIFICATION FOR EWS R6074

CONTRACT: INTERMOUNTAIN
 CONTRACT NO: PO NO 100318 - OG \ CUST. ORDER 314870
 CUSTOMER REF: INTERMOUNTAIN UNIT 1

INSP RELEASE:020,021,022,024,025,026,027

SUPPLIED TO: INTERMOUNTAIN POWER SERVICES CORP.
 850 WEST BRUSH WELLMAN RD.
 DELTA
 UTAH 84624, USA

PACKED AT : ALSTOM POWER UK LTD.
 WILLIAMS WORKS
 NEWBOLD ROAD

SHEET 4 OF 7

DATE :14/01/2003

CONTACT: MR.G.HIRONS TEL 01788 531053

CASE	DIMENSIONS (cm)			CAPACITY CUBIC (m)	WEIGHT (kg)	
	LENGTH	WIDTH	HEIGHT		GROSS	NET
3273C	109	109	89	1.0574	1000	900

ITEM REFERENCE	DESCRIPTION	QUANTITY	DRAWING NO	ITEM	REFERENCE
2BMBR0000042	PACKER SBE QCA D700	2	E202/5396G01 D297/1118P01	2	2BMBR0000042
2BMBR0000043	HP CYLINDER INTERFACE 5/16"-18 UNC-2A SKT HD CAP SCR BW	2	E202/5396G01 IF21432A53	3	2BMBR0000043
2BMBR0000044	HP CYLINDER INTERFACE TRANSVERSE PACKER	2	E202/5396G01 D297/1418P01	4	2BMBR0000044
2BMBR0000045	HP CYLINDER INTERFACE 5/16"-18 UNC-2A SKT HD CAP SCR BW	2	E202/5396G01 IF21432A54	5	2BMBR0000045
2BMBR0000050	HP CYLINDER INTERFACE PACKER	2	E202/5396G01 D297/1420P01	10	2BMBR0000050
2BMBR0000051	HP CYLINDER INTERFACE CRUSHING PEG	8	E202/5396G01 D297/1093P03	11	2BMBR0000051
2BMBR0000052	HP CYLINDER INTERFACE 3/4"-16UNC-2A SPECIAL SCREW HP CYLINDER INTERFACE	8	E202/5396G01 D297/1398P01	12	2BMBR0000052

IP7008421

ALSTOM Power Steam Turbines

PACKING SPECIFICATION FOR EWN R6074

CONTRACT: INTERMOUNTAIN
 CONTRACT NO: PO NO 100318 - OG \ CUST. ORDER 314870
 CUSTOMER REF: INTERMOUNTAIN UNIT 1

INSP RELEASE:020,021,022,024,025,026,027

SUPPLIED TO: INTERMOUNTAIN POWER SERVICES CORP.
 850 WEST BRUSH WELLMAN RD.
 DELTA
 UTAH 84624, USA

PACKED AT : ALSTOM POWER UK LTD.
 WILLIAMS WORKS
 NEWBOLD ROAD

SHEET 5 OF 7

DATE :14/01/2003

CONTACT: MR.G.HIRONS TEL 01788 531053

CASE	DIMENSIONS (cm)			CAPACITY CUBIC (m)	WEIGHT (kg)	
	LENGTH	WIDTH	HEIGHT		GROSS	NET
3273C	109	109	89	1.0574	1000	900

ITEM REFERENCE	DESCRIPTION	QUANTITY	DRAWING NO	ITEM	REFERENCE
2BMBR0000053	PACKER	2	E202/5396G01 D297/1421P01	13	2BMBR0000053
2BMBR0000054	HP CYLINDER INTERFACE COVER PLATE	4	E202/5396G01 D297/1422P01	14	2BMBR0000054
2BMBR0000055	HP CYLINDER INTERFACE BOLT 1/2" X 13UNC X 1.1/2"LG	8	E202/5396G01 IF20004A10	15	2BMBR0000055
2BMBR0000056	HP CYLINDER INTERFACE PACKER	4	E202/5396G01 D297/1295P01	16	2BMBR0000056
2BMBR0000057	HP CYLINDER INTERFACE PACKER	4	E202/5396G01 D297/1295P02	17	2BMBR0000057
2BMBR0000058	HP CYLINDER INTERFACE FLANGE SCREW	8	E202/5396G01 D297/1049P05	18	2BMBR0000058
2BMBR0000059	HP CYLINDER INTERFACE DOWEL	8	E202/5396G01 D297/1121P01	19	2BMBR0000059
	HP CYLINDER INTERFACE				

IP7008422

ALSTOM Power Steam Turbines

PACKING SPECIFICATION FOR EWN R6074

CONTRACT: INTERMOUNTAIN
 CONTRACT NO: PO NO 100318 - OG \ CUST. ORDER 314870
 CUSTOMER REF: INTERMOUNTAIN UNIT 1

INSP RELEASE:020,021,022,024,025,026,027

SUPPLIED TO: INTERMOUNTAIN POWER SERVICES CORP.
 850 WEST BRUSH WELLMAN RD.
 DELTA
 UTAH 84624, USA

PACKED AT : ALSTOM POWER UK LTD.
 WILLANS WORKS
 NEWBOLD ROAD

CONTACT: MR.G.HIRONS TEL 01788 531053

SHEET 6 OF 7 DATE :14/01/2003

CASE	DIMENSIONS (cm)			CAPACITY CUBIC (m)	WEIGHT (kg)	
	LENGTH	WIDTH	HEIGHT		GROSS	NET
3273C	109	109	89	1.0574	1000	900

ITEM REFERENCE	DESCRIPTION	QUANTITY	DRAWING NO	ITEM	REFERENCE
2EMBR0000060	SUSPENSION KEY DOWEL	5	E202/5396G01 D297/1064P01	20	2EMBR0000060
2EMBR0000061	HP CYLINDER INTERFACE SKT HD CAP SCREW 1"-8UNC-2A	10	E202/5396G01 D297/1409P01	22	2EMBR0000061
2EMBR0000062	HP CYLINDER INTERFACE PLUG	10	E202/5396G01 D297/1406P01	23	2EMBR0000062
2EMBR0000063	HP CYLINDER INTERFACE DOWEL 1/2" DIA	4	E202/5396G01 D297/1159P08	24	2EMBR0000063
2EMBR0000064	HP CYLINDER INTERFACE PLUG	4	E202/5396G01 D297/1407P01	25	2EMBR0000064
2EMBR0000065	HP CYLINDER INTERFACE 1/4" UNC HEX SOC SET SCREW	14	E202/5396G01 IF21506A8	26	2EMBR0000065
2EMBR0000066	HP CYLINDER INTERFACE TAB WASHER	4	E202/5396G01 D298/1098P14	27	2EMBR0000066
	HP CYLINDER INTERFACE				

IP7008423

ALSTOM Power Steam Turbines

PACKING SPECIFICATION FOR EWN R6074

CONTRACT: INTERMOUNTAIN
 CONTRACT NO: PO NO 100318 - OG \ CUST. ORDER 314870
 CUSTOMER REF: INTERMOUNTAIN UNIT 1

INSP RELEASE:020,021,022,024,025,026,027

SUPPLIED TO: INTERMOUNTAIN POWER SERVICES CORP.
 850 WEST BRUSH WELLMAN RD.
 DELTA
 UTAH 84624, USA

PACKED AT : ALSTOM POWER UK LTD.
 WILLIAMS WORKS
 NEWBOLD ROAD


CONTACT: MR.G.HIRONS TEL 01788 531053

SHEET 7 OF 7 DATE :14/01/2003

CASE	DIMENSIONS (cm)			CAPACITY CUBIC (m)	WEIGHT (kg)	
	LENGTH	WIDTH	HEIGHT		GROSS	NET
3273C	109	109	89	1.0574	1000	900

ITEM REFERENCE	DESCRIPTION	QUANTITY	DRAWING NO	ITEM	REFERENCE
2BMBR0000068	CONE EXTENSION	2	E202/5396G01 D297/1455P01	21	2BMBR0000068
2BMBR0000070	HP CYLINDER INTERFACE PULSING BLOCK (SPEC.PS31/103)	1	E202/5396G01 D297/1177P01	0175	2BMBR0000070
2BMBR0000073	HP CYLINDER INTERFACE JACKING SCREW 1/2"-13UNC-2A HP SHAFT GLAND ASSEMBLY - CENTRE	4	E212/3856G01 D297/1089P05	7	2BMBR0000073

IP7008424

ALSTOM Power Ltd RUGBY WORKS
 Lloyd's Approved to ISO 90012000
 This is to certify that all the items in the shipment detailed
 above have been subject to our inspection for adherence to
 the requirements of the Contract Document and/or Subsequent
 amendments and to the relevant design requirements and/or
 codes of practice
 Signed: 
 Quality Manager